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The Institute of Chartered Accountants in England and Wales

P 10,170

Incorporated by Royal Charter, 11 May 1880

Accounting and Business Research

Volume 31   Number 1   Winter 2000

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Models of the reporting entity and accounting for equity-based consideration

John Forker*

Abstract – Conventional accounting practice for equity-based consideration (EBC) and, in particular for employee share schemes (ESS), recognises an expense for cash-based settlement but not for settlement by the issue of new shares. In principle, expense recognition based on a choice of method of settlement is inconsistent and, in the case of ESS, undermines managerial accountability by understating pay, overstating profit and weakening the link between reported profit and the change in the wealth of existing shareholders. The choice of a model of the reporting entity (MRE) provides the conceptual basis to address issues in accounting for EBC. In the light of the controversy over the FASB's recommendation for partial expense recognition based on the date of grant fair value of EBC, and the recent decisions of the ASB and G4+1 to consider how to account for EBC, this paper reviews the role of MRE in expense recognition for EBC. To provide a consistent, reliable and relevant measure of expense for resources acquired by EBC, the application of fair value and clean surplus accounting is recommended. A method of presentation is proposed to separate the expense based on the date of grant fair value from the cost of subsequent changes in the value of EBC. This allows income measured according to different MREs to be reported in a single set of financial statements, and allows users to choose the information best suited to their purposes.

1. Introduction

Choosing a model of the reporting entity (MRE) for the purpose of measuring profit is important for conceptual and practical reasons, particularly in the context of accounting for equity-based consideration[1] (EBC). Determination of transaction prices for the purpose of expense recognition is normally straightforward. If input prices change before the date of consumption then current cost models provide guidance. In the case of EBC, however, additional difficulties arise that are currently under review by accounting regulators, but as yet remain unresolved. Although the issue of measurement of the value of EBC has effectively been resolved by the development of valuation models,[2] important conceptual issues remain relating to the choice of the measurement date for the purpose of expense recognition. In the case of EBC, for example, where labour services are remunerated by an employee share scheme (ESS), the alternative dates of measurement are the date

of grant, the date of vesting, when the employee is entitled to exercise the option, or the date of exercise. Conceptually, the choice of measurement date is determined by two factors: first, the MRE to be applied when measuring income and, second, the method by which EBC is to be settled. Settlement on the date of exercise can be by the issue of a new share or by a cash payment equal to the difference between the share price on the date of exercise and the exercise price. These issues are addressed in this paper.

In contrast to the conceptual issues relating to expense recognition, conventional practice is simple but biased toward recognition only for cash settlement. If EBC is settled in cash then expense recognition is based on the net cash outlay. If, however, EBC is settled by issuing new equity, then no expense is recognised as it is valued at the exercise price. In effect, for EBC settled by equity, the payment for the resources is funded by the capital contributed by existing shareholders in the form of the dilution of equity resulting from the issue of equity at less than fair value. By the application of dirty surplus accounting, the cost of the resources acquired is netted against the capital contributed by existing shareholders. In the particular case of ESS, settled by the issue of equity, employee remuneration is understated and income is

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[1] EBC is used generically to reflect the purchase of any type of asset or service where payment is based on share price performance. Employee share schemes (ESS) are a particular type of EBC where labour services are purchased.

[2] The FASB accepts that option pricing models such as the Black-Scholes model, suitably adjusted to reflect the characteristics of EBC, provide relevant and reliable information (FASB, 1995, para. 19).

overstated by the non-recognition of remuneration expense. The effect is to weaken the link between actual pay and reported performance and to undermine managerial accountability to shareholders.[3]

For the purpose of measuring income, an MRE defines the boundary of the residual entity. There are three main MREs. The first is Paton's (1922) 'All Equities' model (AEM). In the AEM the balance sheet equation is Assets = Equities. The boundary of the residual entity includes all financial instruments and there is no distinction, for the purpose of measuring income, between equity and liability financing. Interest, dividends and wealth transfers between 'equities' are accounted for as appropriations of income and the method of financing EBC has no impact on income. The second MRE is the equity model (EM). This is based on the Assets less Liabilities = Equity equation, where equity is defined to include all equity instruments including EBC financed by the issue of new shares. In the EM, expense recognition for EBC depends on the form of settlement. Conventionally, no expense is recognised for EBC financed by the issue of new shares while full cost is recognised for liability financed EBC. The final MRE, the pre-existing equity model (PEEM) is also based on the assets less liability equals equity relationship but the residual entity is narrowly defined to include only the rights of the pre-existing equity. All EBC is classified as liability funded; thus the date of exercise value of EBC is recognised as an expense irrespective of how EBC is financed.

The significance of the choice of an MRE as the basis for consistent financial reporting, particularly when accounting for EBC, has been overlooked in UK textbooks and professional guidance.[4] For the special case of employee share schemes (ESS) while there is general support for uniform expense recognition based on exercise date measurement (Egginton, Forker and Grout, 1993, Clarke, 1993,

Samuels and Lymer, 1996) the impact of choice among alternative MRE has been highlighted by three recent developments.[5] First, the strong adverse reaction in the US to the FASB's proposal (FASB, FAS123, 1995), that date of grant fair value should serve as the basis for expense recognition for equity funded EBC can be taken as an indication of the importance of its economic consequences. In FAS123 consistent with the EM, expense recognition for liability funded EBC is based on exercise date measurement while date of grant measurement is applied to EBC settled by the issue of new equity.

A second development is the ASB's consistent acknowledgement in the exposure drafts of the Statement of Principles (ASB, 1995: 3.52, 1999(a): 4.46–4.47) that the capital contribution by existing shareholders in the form of equity dilution from issuing shares for less than fair value should be recognised as a loss to the entity. This is consistent with the PEEM. Following the addition of a project on accounting for equity to the ASB's agenda in 1999, and so as not to prejudice its outcome, reference to EBC has been removed in the final version of the Statement of Principles (ASB, 1999c). This potential challenge to FASB's adoption of the EM opens up the prospect of a fundamental and significant point of departure between accounting principles in the US and UK. Finally, the need for a resolution of national differences in reporting performance at a conceptual level has been highlighted by the recent position paper on Reporting Financial Performance: Proposals for Change (ASB, 1999b). The paper presents the view of the G4+1[6] on the presentation of comprehensive income in a single performance statement. However, issues relating to recognition and measurement of financial instruments in the context of different MRE have yet to be addressed (ASB, 1999(b): 2.16).

The remainder of the paper is organised as follows. Section 2 reviews the issues in accounting for EBC, in particular ESS, and shows that conventional dirty surplus accounting for equity based settlement is, in principle, inconsistent, unreliable and an inadequate basis for the prediction[7] of profit and the accountability of management. The current UK and US authoritative guidance on EBC is reviewed in Section 3. In Section 4, application of fair values for EBC is illustrated for EBC settled in cash to acquire a tangible asset. This facilitates clean surplus accounting and full evaluation of managerial performance by the separate recognition of expense equivalent to immediate cash settlement as well as reporting the impact of share price changes on the cost of EBC. The result is that income will reflect the change in wealth of existing shareholders and provide a suitable basis to assess and reward managerial performance. Against

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[3] The issue of non-recognition of remuneration expense for equity funded employee share schemes has attracted press comment. The Boots Company plc has recently switched to cash-based funding and full expense recognition to provide transparency in reporting pay and performance.

[4] The main UK texts, Alexander and Briton (1999), Elliott and Elliott (1998) and Lewis and Pendrill (1996) do not address the issue of choice of MRE nor do they consider the principles of accounting for EBC.

[5] Clarke (1993) advocates retention of the distinction between debt and equity and the classification of ESS as liabilities. Subsequently, however, in FAS123 (FASB, 1995), the debt/equity distinction in the EM drives a wedge between expense recognition for ESS depending on how they are funded.

[6] G4+1 comprises members of the standard-setting bodies of Australia, Canada, New Zealand, UK and US and the IASC.

[7] For the purpose of prediction, users will wish to separately appraise operating performance from the skills of financial management as reflected by price changes on financial instruments in order to identify permanent from transitory components of income (Black, 1980, 1993, Ohlson, 1999).

Table 1
Accounting for share-based consideration: valuation alternatives

Measurement dates	Measurement methods		
	Intrinsic value	Minimum value	Fair value
Grant date (c_g)	$S_g - X$	$S_g e^{-qt} - Xe^{-r_f t}$	$S_g e^{-qt} N(d_1) - Xe^{-r_f t} N(d_2)$
Vesting date (c_v)	$S_v - X$	$S_v e^{-qt} - Xe^{-r_f t}$	$S_v e^{-qt} N(d_1) - Xe^{-r_f t} N(d_2)$
Exercise date (c_T)	$S_T - X$	$S_T - X$	$S_T - X$
Current value (c_c)	$S_c - X$	$S_c e^{-qt} - Xe^{-r_f t}$	$S_c e^{-qt} N(d_1) - Xe^{-r_f t} N(d_2)$

S_g, S_v, S_T, S_c: are, respectively, share prices at dates of grant, vesting, exercise and end of current year
X: exercise price
t: time from measurement date to date of exercise.

Fair value: Is the Black and Scholes (1973) option pricing formula adjusted for payment of dividend where:
r_f is the risk free rate of interest
t time till maturity of the option
N(d) is the cumulative normal density function and
q is the continuously compounded dividend yield

d_1
$$= \frac{\ln (S/X) + [r_f t - q + \sigma^2/2] t}{\sigma \sqrt{t}}$$

d_2 $= d_1 - \sigma \sqrt{t}$

Where σ is the standard deviation of the continuously compounded annual rate of return on the share.

this benchmark, expense recognition of price changes for EBC under the application of different MREs is evaluated in Section 5. In Section 6, the inconsistencies in current UK authoritative guidance for issues related to EBC are highlighted. A recommended practice for EBC is set out in Section 7 that includes income components for each of the three main MREs. This has wider application in accounting for warrants, convertible loan stock and fixed interest investments. The conclusions are presented in Section 8.

2. Accounting for employee share schemes

Accounting problems generally arise when input costs change between the date of acquisition and the subsequent date of consumption. The case of labour services rewarded by ESS is unusual in that consumption precedes the payment by a period of years. A further complication is that as the cost is contingent on the share price at the date of exercise and it is unknown when the labour services are consumed. Alternative measurement methods and dates are also available and a choice between them is necessary.

2.1. Measurement dates and methods

A prior condition for expense recognition is measurement of the cost of share based remuneration. This necessitates a choice between alternative measurement methods and dates. In general, share

schemes specify a vesting period as the minimum term to be served by the employee to be eligible to exercise the option. The accounting significance of the vesting period is that it is the period over which the recognised cost is allocated. Three alternative measurement dates are the option values at the date of grant, the date of vesting or at the date of exercise.[8] The difference between these values can be substantial as the exercise period is usually between three and 10 years following the date of grant.

The recent development of option pricing models, suitably modified to incorporate expectations for forfeiture during the vesting period, as well as the likelihood of early exercise prior to the final exercise date, has effectively removed obstacles to obtaining reliable measures of the value of options. There remains, however, the choice of an appropriate measurement date and measurement method. In accounting for ESS a range of alternative values are available. A comprehensive set of these is presented in Table 1. In general, there are three alternative measurement methods: the intrinsic, the minimum and the fair value methods. The intrinsic value is given by the difference between the share price and the exercise price. Typically,

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[8] In the case of vesting and exercise date measurement, estimates have to be made of the likely cost based on the prospective measurement dates at the time of expense recognition.

Table 2
Numerical example of Black-Scholes values

Measurement dates	*Measurement methods*		
	Intrinsic value (£m)	Minimum value (£m)	Fair value (£m)
Date of grant (c_g)	0	1.26	3.9
Current value (c_t)	15	14.97	15.21
Date of exercise (c_T)	40	40	40

Values are based on the application of the Black and Scholes formulae set out in Table 1 with the following parameters: $S_0 = X = £1$; $S_t = £2.50$ at end of one year and £5 at end of year five; dividend yield = 2%; risk free rate of interest = 5%; standard deviation of annual share price returns = 45%; options can be exercised after five years; options granted over 10m shares.

exercise prices are set equal to the share price at the date of grant, giving a zero cost for date of grant intrinsic valuation. In the minimum value method, the time value of the delay in paying the exercise price is incorporated in the valuation formula and the fair value method further includes the value of share price volatility. Each of these methods is applicable to the three different measurement dates: the date of grant, the date of vesting and the date of exercise. For the purpose of illustration, the formula for the fair value method is based on the Black-Scholes option pricing model adapted to reflect the payment of expected dividends (Hull, 1997: 240). Numerical values for the formulae in Table 1 are set out in Table 2 based on the following assumed parameters: a constant risk free rate of interest (r_{fl}) of 5%, an annual standard deviation of the share price return (σ) of 45%, a dividend yield (q) of 2% and the date of vesting and exercise are identical and occur after five years.[9] To illustrate expense recognition in financial statements it is assumed that share options for 10 m shares were granted at the beginning of the financial year when the exercise price of £1 per share was equal to the issuing company's share price. It is also assumed that the share price was £2.50 at the end of the first year and £5 at the date of exercise.

2.2. Conventional dirty surplus accounting for ESS

In conventional accounting practice, expense recognition for ESS is influenced by the choice of either equity- or cash-based settlement. In the case of the latter, settlement can be by the purchase of an existing share in the market or by cash payment equal to the difference between the share price on the exercise date and the exercise price. Conventional expense and value recognition is

cash based. As employees are granted options free of charge there is no expense recognition at the date of grant. Similarly, at the date of exercise there is no expense recognition for settlement based on the issue of new equity. New shares issued in settlement of exercised options are valued at the exercise price received and the excess of the nominal value is credited to share premium.

However, the issue of equity at less than fair value dilutes the value of existing shareholders' equity. In effect, existing shareholders contribute capital to the company to pay for employee services. From the perspective of fair value accounting, where new issues are recognised at current market value, non-recognition of expense for equity settlement is the result of dirty surplus accounting. Neither the capital contributed by existing shareholders nor the payment to employees is recognised in the financial statements. Rather they are, in effect, netted in the equity section of the balance sheet. This important insight can be easily demonstrated by reference to the clean surplus relation. Clean surplus income is the periodic change in the difference between opening and closing book values less the contribution of capital from shareholders:

$$CSI = BVE_t - BVE_{t-1} - CC$$

where CSI is clean surplus income, BVE is the book value of equity, with time subscripts, and CC is capital contributed by existing shareholders. In the case of a firm with no transactions in a period other than the grant and exercise of employee options then, in conventional accounting, where the new equity is valued at the exercise price received, dirty surplus income is reported as $BVE_t - BVE_{t-1} = 0$. Under clean surplus accounting the capital contributed by existing shareholders would be recognised by accounting for new equity at its fair value and the clean surplus loss is the remuneration expense, equal to capital contributed (CC).

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[9] To obtain the expositional benefits of describing EBC for a tangible asset rather than for intangible labour services the dates of vesting and exercise are set equal.

In the case of cash-based settlement, exercise date measurement is conventionally applied, and based on the data in Table 2, the £40m cash payment on the date of exercise will be recognised as an employment expense. The cash bias in conventional accounting that results in expense recognition only for cash based settlement of ESS, but ignores it for equity settlement is unsatisfactory as it runs counter to a number of financial accounting principles (ASB, 1999c, ch. 3). Differential expense recognition based on the method of settlement impairs the usefulness of financial statements. Comparability is reduced by inconsistent expense recognition where methods of settlement differ. Similarly, dirty surplus accounting for equity funded options undermines reliability. Managerial accountability for the link between pay and performance is weakened by providing incomplete data on the employee benefits that are funded by capital contributions from existing shareholders. Finally, the relevance of reported profit for the purpose of assessing managerial performance and predicting future performance will be weakened by the over-statement of periodic profit that results from dirty surplus accounting for ESS financed by the issue of new equity.

3. Authoritative guidance
3.1. UK guidance
In the UK, specific guidance on accounting for ESS is provided in UITF13 and 17 (ASB, 1995 and 1997). The guidance in both cases is effectively based on the recognition of cash transactions. Date of grant intrinsic value based on the fair (current market) value of the shares at the date of grant is the recommended minimum expense to be charged for ESS. Typically, no expense is recognised as most schemes set the exercise price equal to the share price on the date of grant. If, however, shares have been purchased, and are held in trust under an employee share ownership plan, then the minimum expense recognised is the difference between the fair (market) value of the shares at date of purchase and the exercise price (UITF17: para.13). A sign of the acute sensitivity to expense recognition for employee share schemes, however, was the failure of the UITF to reach a consensus in UITF17 that its recommendation on intrinsic value expense recognition should apply to SAYE schemes which normally have a positive intrinsic value.

In both the draft and revised draft of the Statement of Principles (ASB, 1995: 3.52, ASB, 1999a: 4.46–4.47), accounting for contributions of capital by pre-existing shareholders in the form of equity issued at less than fair value is specifically addressed. If equity is issued at less than fair value as pay for resources, as in the case of EBC, the di-

lution suffered by pre-existing shareholders is classified as a loss to the entity. In the case of EBC, this is consistent with the application of the PEEM and clean surplus accounting. The necessary accounting policy to accommodate this is to recognise the fair value of equity issued at the date of exercise. This allows recognition of capital contributed in the balance sheet and expense for resources consumed in the income statement. Following the decision of the ASB in 1999 to add a project on accounting for equity to its agenda, the final version of the Statement of Principles makes no reference to accounting for contributions of capital that take the form of issues of equity at less than fair value.

3.2. US guidance
In the initial US accounting requirement for ESS (APB, 1972) equity-funded schemes were classified between those incorporating a performance condition and other schemes. In the case of the former, date of exercise expense recognition was required but there was no requirement to recognise an expense for non-performance-based schemes. The outcome was that incentive efficient schemes were avoided by companies. This adverse economic consequence of an accounting regulation was widely regarded as unsatisfactory. In FAS123 (FASB, 1995) the fair value principle is applied to ESS settled by the issue of new equity to justify expense recognition based on date of grant fair values. In the view of the FASB, 'Valuable financial instruments given to employees give rise to compensation cost that is properly included in measuring an entity's net income.' (FASB, 1995: para. 75) To further justify expense recognition based on fair value at the date of grant,[10] the FASB took the view that ' ....a principle shareholder makes a contribution of capital to the entity and the entity awards equity instruments to its employees.' (FASB, 1995: para 15) In effect, the FASB adopted the view that equity funded ESS are financed from capital contributed by existing shareholders in the form of dilution of their equity-based on the date of grant value of options. In contrast, following the FASB's conceptual framework (FASB, 1985) ESS settled in cash are classified as liabilities and exercise date measurement applies. The application of different dates of measurement for equity and liability funded ESS, date of grant and date of exercise respectively, is consistent with the EM. Using the values set out in Table 2, the FASB's proposals result in expense

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[10] Two members of the FASB dissented in FAS123 from the choice of date of grant valuation in favour of date of vesting valuation on the grounds that the later date is when companies are obligated to deliver the exercisable shares. The choice of either of these dates makes no difference for the analysis of this paper.

recognition of £3.9m for equity funded schemes and £40m for cash-based settlement. In the face of considerable opposition from preparers of financial statements (Zeff, 1996) the FASB was, however, forced to abandon its firmly held view in favour of date of grant fair value based expense recognition for ESS funded by new shares. Instead, FAS123 recommended date of grant expense recognition, otherwise firms were required to provide pro-forma disclosure of the impact on reported earnings of date of grant expense recognition.

Despite the considerable efforts of the FASB and the scope provided in the ASB's guidance, the current state of accounting for ESS funded by new equity remains focussed on cash transactions. The effect is to provide scope for earnings management based on the funding method chosen. Also, cash-based recognition undermines managerial accountability for equity financed transactions that expose shareholders to unhedged wealth transfers when share prices rise.

4. Fair value accounting for the acquisition of resources

To clarify fundamental aspects of accounting for ESS and to provide a basis for recommendations, a general analysis of the case of EBC to finance the purchase of a tangible asset, in this case a computer processor is illustrated. To provide a benchmark for assessing different accounting alternatives the analysis is cast in terms of the application of fair value accounting principles. In general, where a divergence occurs between the market value of resources acquired and the cost to the firm, then additional accounting procedures are appropriate. Examples are the purchase of assets partly funded by government grants, or gifts of assets to the firm. In these cases the principle of fair value at the date of acquisition is applicable (Paton 1946: 194). This has the effect of splitting the transaction into two parts and accounting separately for each part. To provide a consistent basis for measuring the cost of resources consumed, assets are recognised in the balance sheet at fair value at the date of acquisition. Subsequent amortisation of services is based on this fair value. Then, as a separate transaction, the difference between the fair value of inputs at the date of acquisition and the price paid is separately identified in the income statement to display the additional financial consequences of the transaction.

The separate disclosure of different components of income has long been advocated, in particular by Edwards and Bell (1961) to dichotomise income between operating profit and 'cost savings'[11] and more generally, to exclude windfall or transitory effects (Lindahl, 1939). In the case of EBC,

date of grant measurement is equivalent to the fair value of resources at the date of acquisition (£3.9m, Table 2). Recognition and separate display of EBC price changes subsequent to the date of measurement (£40m–£3.9m, Table 2) is advocated in this paper to report the effect of the choice of payment for resources financed by EBC. Date of grant fair value for EBC, irrespective of the method of settlement, provides a basis to evaluate operating performance against the benchmark of contemporary economic conditions that is comparable across firms and for different methods of funding EBC. Separate identification of subsequent price changes in the value of EBC provides information on the consequences of management's decision not to hedge subsequent price changes.

The general thesis of this paper is that expense recognition for EBC should be based on the fair value at the date of exercise and independent of the choice of funding method and the type of asset services acquired. Further, the cost of EBC should be separately disclosed in the income statement between date of grant fair value[12] and price changes in the value of EBC subsequent to the date of grant.[13]

4.1. EBC for a tangible asset
The principles of fair value accounting for EBC apply equally to tangible and intangible assets but as a first step the accounting issues can be comprehended more easily when applied to the acquisition of a tangible asset. The following example, based on identical values for immediate cash payment and EBC, relates to the marketing of a computer processor. The analysis proceeds in two stages in order to explore the conceptual subtleties of accounting for EBC. First, to provide a basis for comparing different accounting alternatives the accounting entries for immediate cash payment for the processor are described. Next, to highlight the general nature of the price level accounting proce-

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[11] The dichotomisation of income proposed by Edwards and Bell has not been without criticism (Drake and Dupoch, 1965 and Prakash and Sunder, 1979). However, subsequent theoretical work has led to a reappraisal of the role of dichotomisation. In particular, Ohlson (1999) formally identifies the significance of differentiating permanent and transitory components of income for valuation purposes.

[12] In the case of EBC, separate identification of operating expense based on date of grant fair value recognition from subsequent value changes can be further justified in terms of highlighting windfall (unexpected) effects. Apart from share prices, unexpected changes in the values of the parameters of the valuation model are also windfalls. A formal analysis of windfalls in the context of income measurement is provided in Lindahl (1939: 74–136).

[13] Application of the principles of fair value measurement as a basis for good accounting practice, and the separate identification of operating and financing costs in the income statement, are explicitly endorsed in the Statement of Principle (ASB, 1999c: 6.10–6.16, 7.9–7.10).

In the case of cash-based settlement, exercise date measurement is conventionally applied, and based on the data in Table 2, the £40m cash payment on the date of exercise will be recognised as an employment expense. The cash bias in conventional accounting that results in expense recognition only for cash based settlement of ESS, but ignores it for equity settlement is unsatisfactory as it runs counter to a number of financial accounting principles (ASB, 1999c, ch. 3). Differential expense recognition based on the method of settlement impairs the usefulness of financial statements. Comparability is reduced by inconsistent expense recognition where methods of settlement differ. Similarly, dirty surplus accounting for equity funded options undermines reliability. Managerial accountability for the link between pay and performance is weakened by providing incomplete data on the employee benefits that are funded by capital contributions from existing shareholders. Finally, the relevance of reported profit for the purpose of assessing managerial performance and predicting future performance will be weakened by the over-statement of periodic profit that results from dirty surplus accounting for ESS financed by the issue of new equity.

3. Authoritative guidance
3.1. UK guidance

In the UK, specific guidance on accounting for ESS is provided in UITF13 and 17 (ASB, 1995 and 1997). The guidance in both cases is effectively based on the recognition of cash transactions. Date of grant intrinsic value based on the fair (current market) value of the shares at the date of grant is the recommended minimum expense to be charged for ESS. Typically, no expense is recognised as most schemes set the exercise price equal to the share price on the date of grant. If, however, shares have been purchased, and are held in trust under an employee share ownership plan, then the minimum expense recognised is the difference between the fair (market) value of the shares at date of purchase and the exercise price (UITF17: para.13). A sign of the acute sensitivity to expense recognition for employee share schemes, however, was the failure of the UITF to reach a consensus in UITF17 that its recommendation on intrinsic value expense recognition should apply to SAYE schemes which normally have a positive intrinsic value.

In both the draft and revised draft of the Statement of Principles (ASB, 1995: 3.52, ASB, 1999a: 4.46–4.47), accounting for contributions of capital by pre-existing shareholders in the form of equity issued at less than fair value is specifically addressed. If equity is issued at less than fair value to pay for resources, as in the case of EBC, the di-

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3.2. US guidance

In the initial US accounting requirement for ESS (APB, 1972) equity-funded schemes were classified between those incorporating a performance condition and other schemes. In the case of the former, date of exercise expense recognition was required but there was no requirement to recognise an expense for non-performance-based schemes. The outcome was that incentive efficient schemes were avoided by companies. This adverse economic consequence of an accounting regulation was widely regarded as unsatisfactory. In FAS123 (FASB, 1995) the fair value principle is applied to ESS settled by the issue of new equity to justify expense recognition based on date of grant fair values. In the view of the FASB, 'Valuable financial instruments given to employees give rise to compensation cost that is properly included in measuring an entity's net income.' (FASB, 1995: para. 75) To further justify expense recognition based on fair value at the date of grant,[10] the FASB took the view that ' .... a principle shareholder makes a contribution of capital to the entity and the entity awards equity instruments to its employees.' (FASB, 1995: para 15) In effect, the FASB adopted the view that equity funded ESS are financed from capital contributed by existing shareholders in the form of dilution of their equity-based on the date of grant value of options. In contrast, following the FASB's conceptual framework (FASB, 1985) ESS settled in cash are classified as liabilities and exercise date measurement applies. The application of different dates of measurement for equity and liability funded ESS, date of grant and date of exercise respectively, is consistent with the EM. Using the values set out in Table 2, the FASB's proposals result in expense

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[10] Two members of the FASB dissented in FAS123 from the choice of date of grant valuation in favour of date of vesting valuation on the grounds that the later date is when companies are obligated to deliver the exercisable shares. The choice of either of these dates makes no difference for the analysis of this paper.

recognition of £3.9m for equity funded schemes and £40m for cash-based settlement. In the face of considerable opposition from preparers of financial statements (Zeff, 1996) the FASB was, however, forced to abandon its firmly held view in favour of date of grant fair value based expense recognition for ESS funded by new shares. Instead, FAS123 recommended date of grant expense recognition, otherwise firms were required to provide pro-forma disclosure of the impact on reported earnings of date of grant expense recognition.

Despite the considerable efforts of the FASB and the scope provided in the ASB's guidance, the current state of accounting for ESS funded by new equity remains focussed on cash transactions. The effect is to provide scope for earnings management based on the funding method chosen. Also, cash-based recognition undermines managerial accountability for equity financed transactions that expose shareholders to unhedged wealth transfers when share prices rise.

4. Fair value accounting for the acquisition of resources

To clarify fundamental aspects of accounting for ESS and to provide a basis for recommendations, a general analysis of the case of EBC to finance the purchase of a tangible asset, in this case a computer processor is illustrated. To provide a benchmark for assessing different accounting alternatives the analysis is cast in terms of the application of fair value accounting principles. In general, where a divergence occurs between the market value of resources acquired and the cost to the firm, then additional accounting procedures are appropriate. Examples are the purchase of assets partly funded by government grants, or gifts of assets to the firm. In these cases the principle of fair value at the date of acquisition is applicable (Paton 1946: 194). This has the effect of splitting the transaction into two parts and accounting separately for each part. To provide a consistent basis for measuring the cost of resources consumed, assets are recognised in the balance sheet at fair value at the date of acquisition. Subsequent amortisation of services is based on this fair value. Then, as a separate transaction, the difference between the fair value of inputs at the date of acquisition and the price paid is separately identified in the income statement to display the additional financial consequences of the transaction.

The separate disclosure of different components of income has long been advocated, in particular by Edwards and Bell (1961) to dichotomise income between operating profit and 'cost savings'[11] and more generally, to exclude windfall or transitory effects (Lindahl, 1939). In the case of EBC,

date of grant measurement is equivalent to the fair value of resources at the date of acquisition (£3.9m, Table 2). Recognition and separate display of EBC price changes subsequent to the date of measurement (£40m–£3.9m, Table 2) is advocated in this paper to report the effect of the choice of payment for resources financed by EBC. Date of grant fair value for EBC, irrespective of the method of settlement, provides a basis to evaluate operating performance against the benchmark of contemporary economic conditions that is comparable across firms and for different methods of funding EBC. Separate identification of subsequent price changes in the value of EBC provides information on the consequences of management's decision not to hedge subsequent price changes.

The general thesis of this paper is that expense recognition for EBC should be based on the fair value at the date of exercise and independent of the choice of funding method and the type of asset services acquired. Further, the cost of EBC should be separately disclosed in the income statement between date of grant fair value[12] and price changes in the value of EBC subsequent to the date of grant.[13]

4.1. EBC for a tangible asset

The principles of fair value accounting for EBC apply equally to tangible and intangible assets but as a first step the accounting issues can be comprehended more easily when applied to the acquisition of a tangible asset. The following example, based on identical values for immediate cash payment and EBC, relates to the marketing of a computer processor. The analysis proceeds in two stages in order to explore the conceptual subtleties of accounting for EBC. First, to provide a basis for comparing different accounting alternatives the accounting entries for immediate cash payment for the processor are described. Next, to highlight the general nature of the price level accounting proce-

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[11] The dichotomisation of income proposed by Edwards and Bell has not been without criticism (Drake and Dupoch, 1965 and Prakash and Sunder, 1979). However, subsequent theoretical work has led to a reappraisal of the role of dichotomisation. In particular, Ohlson (1999) formally identifies the significance of differentiating permanent and transitory components of income for valuation purposes.

[12] In the case of EBC, separate identification of operating expense based on date of grant fair value recognition from subsequent value changes can be further justified in terms of highlighting windfall (unexpected) effects. Apart from share prices, unexpected changes in the values of the parameters of the valuation model are also windfalls. A formal analysis of windfalls in the context of income measurement is provided in Lindahl (1939: 74–136).

[13] Application of the principles of fair value measurement as a basis for good accounting practice, and the separate identification of operating and financing costs in the income statement, are explicitly endorsed in the Statement of Principle (ASB, 1999c: 6.10–6.16, 7.9–7.10).

Table 3
Accounting for the acquisition of resources using different methods of funding
Fair value accounting: expense recognition independent of financing method (10m options)

Component	Description and classification	Accounting practice proposed
Panel A Operating expense (AEM,EM, PEEM)		
c_g: date of grant fair value: £3.9m	Source of funding: (i) Cash purchase: Equity funding (ii) EBC cash settlement: Liability (iii) EBC equity settlement: Contribution of capital from existing shareholders	Capitalise fair value at date of grant, £3.9m, and credit source of funding. Recognise £0.78m as an operating expense for depreciation over 5 years

Panel B
Price level changes: expense recognition independent of method of financing (PEEM)

Financing activities

Component	Description and classification	Accounting practice proposed
$c_t - c_{t-1}$: change in fair value during year (in first year will be $c_t - c_g$: £15.21m – £3.9m = £11.31m)	Price level changes attributable to share price performance subsequent to date of grant	Recognise as an expense in the financing section of the note on operating income and credit value of financial instrument in the balance sheet
X: exercise price: £10m	Capital contributed by new owners	Credit value of financial instrument (FI) in the balance sheet
$S_T - (X + c_g)$: at date of exercise: £50m–(£10m+3.9m)=£36.1m	Price level change attributable to share price performance over the life of the option	Will have been credited to value of FI in balance sheet by marking to market over the life of the option on date of exercise
c_t: at date of lapsing: N/A	Value of FI in balance sheet at date of lapsing: is a gain from use of option funding strategy	Credit c_t (carrying value) of FI to financing section of the note on operating income

5m options to be settled by cash payment (liability funding) and 5m options to be settled by issue of new equity (equity funding): Equity model (EM)

Component	Description and classification	Accounting treatment
Panel C Price level changes: expense recognition dependent on method of financing (EM)		

Financing activities

Component	Description and classification	Accounting treatment
$c_t - c_{t-1}$: change in fair value during year (in first year will be $c_t - c_g$: £11.31m)	Price level change attributable to share price performance subsequent to date of grant	**Liability funding:** recognise £5.655m (£7.605m–£1.95m) as an expense in the financing section of the note on operating income
		Equity funding: No recognition of value transfer (£5.655m) between pre-existing equity and option holders. Zero sum impact on income
X: exercise price: £10m	Capital contributed by new owners	Credit the value of *equity* and *liability* financial instruments in balance sheet: £5m + £5m

dures, the case of EBC settled in cash is illustrated.

To improve market penetration for its computer processor a development company Y, has structured a sales package to appeal to Z, an Internet software design firm that has entrepreneurial flair but only limited access to capital. The processor costs £3.9m. In the case of Z, it can be acquired by granting Y an option to purchase 10m shares in Z after five years for an exercise price of £1 for each share, which is also the value of a share on the date of purchase. The anticipated useful life of the processor is five years. It will be used at an even rate over its useful life and has an anticipated residual value of zero. Independent of the method of funding, the payment profile for Z at the date of exercise is given by the standard boundary conditions for an option:

Max $[0, S_T-X]$

S_T is the share price at the date of exercise and X is the exercise price. The focus in this paper is on the accounting problem faced by Z, the buyer of the processor and the grantor of the option.[14]

To provide a basis for comparison, the price for immediate payment of the processor has been set equal to the date of grant fair value of £3.9m. Immediate cash payment to acquire the processor poses no accounting problems and provides a benchmark to evaluate EBC alternatives. The accounting issues for immediate payment are straightforward and are described in Panel A (i) of Table 3 and are illustrated numerically in the first part of Table 4.[15] The processor will be recognised as an asset and valued in the balance sheet at the purchase price of £3.9m.[16] Over its five-year useful life depreciation, on a straight-line basis of £0.78m per annum, will be charged against operating income.

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[14] There is a mirror image problem to be resolved by Y, who receives the option. However, this is beyond the scope of this paper.

[15] Operating expense recognition is the same for all methods of funding so a separate column is not provided for immediate cash settlement. Also, the balance sheet entries for immediate settlement are not illustrated.

[16] In FAS123 (FASB, 1995, para. 92–95) in the case of accounting for intangible assets such as employee share schemes an asset is not recognised on the date of grant but an expense is recognised to reflect consumption of services. The corresponding credit is to the financial instrument in the balance sheet. In the FASB's exposure draft, 127-C, the date of grant fair value was recognised as an asset in the manner used in this paper for a tangible asset.

[17] Numerical values for the fair value of dates of grant, end of year and date of exercise are those reported in Table 2.

[18] Regardless of the value initially placed on the computer, the firm will have to deal subsequently with the option in the financial statements.

[19] The EM is fully explained in *Statement of Financial Accounting Concepts No 6* (FASB, 1985) and its adoption was reaffirmed following a subsequent thorough review of the alternatives (FASB, 1990).

4.2. Accounting for equity-based consideration: cash settlement

Given the EBC purchase alternative, the asset will be recognised at its fair value of £3.9m and the date of acquisition operating expense will be £0.78m per annum (Panel A (ii) & (iii), Table 3 and column 1, Table 4). In the case of cash settlement the net cost at date of exercise of £40m[17] is split between the fair value operating expense of £3.9m and the subsequent change in the value of EBC of £36.1m (at the end of year 1 £11.31m (£15.21m–£3.9m). This is reported as a cost of the deferred financing decision (Panel B, Table 3 and Table 4).[18] Although the price change is the result of a financing decision it is part of the cost of the processor and, in principle, should be included in operating costs. This is the approach followed in Table 4, where details of EBC expense recognition are displayed as part of a note for operating income.

5. Models of the reporting entity, methods of settlement and expense recognition

The recognition and separate disclosure of fair value date of operating expense equivalent to immediate cash payment, from subsequent EBC price changes in the operating statement provides a benchmark to evaluate different models of the reporting entity (MRE) considered by accounting regulators. Both the FASB and the ASB have adopted the Assets less Liabilities = Equity model of financial capital maintenance where income is given by the change in the equity residual over the period. An important difference that is particularly relevant to accounting for EBC is the alternative views that can be taken of the equity residual. The MRE adopted by the FASB includes EBC funded by the issue of new equity in the definition of the equity residual. Based on a view of the reporting entity as an economic unit distinct from the ownership interest, this MRE is broadly defined to include all equity financial instruments.[19] The resulting MRE is described as the equity model (EM). In contrast, the ASB, in the exposure drafts of its *Statement of Principles* indicated a preference for a narrower view of the equity residual that focuses on the interest of the pre-existing shareholders and classifies all other financial instruments as liabilities (ASB, 1995: para. 3.52, 1999(a): para. 4.46–47). To reflect its more narrowly drawn boundary for the reporting entity this MRE is described as the pre-existing equity model (PEEM). The role of MRE in measuring financial performance and, in particular, the significance of the differences between MRE has received relatively little attention, particularly in the UK. To provide a basis for an improved understanding of these issues a brief review of the differences between the EM and PEEM is now provided in the

Table 3
Accounting for the acquisition of resources using different methods of funding fair value accounting: expense recognition independent of financing method (10m options) (continued)

$S_T-(X+cg)$: at date of exercise ($£50m-(£10m+3.9m)=£36.1m$)	Price level change attributable to share price performance over the life of the option. Funded by wealth transfer from existing equity	**Liability funding:** Credit £18.05m to value of FI in balance sheet by marking to market over the life of the option on date of exercise
		Equity funding: No recognition in financial statements
c_t: at date of lapsing	Value of FI in balance sheet at date of lapsing: is a gain from use of option funding strategy	**Liability funding:** Credit c_t (carrying value) of FI to financing section of note on operating income
		Equity funding: No recognition in financial statements

Recommended accounting practice
Separate recognition in the income statement of price change effects on liability and equity financial instruments (FI). Separate disclosure in the balance sheet of equity and liability FI

Component	Description and classification	Accounting treatment
Panel D		
c_t-c_{t-1}: change in fair value of *liability* FI during year (in first year will be c_t-c_g)	Price level changes attributable to share price performance subsequent to date of grant for *liability* FI	Recognise as an expense in the *liability* financing section of the note on operating income and credit the value of the FI in the balance sheet
c_t-c_{t-1}: change in fair value of equity FI during year (in first year will be c_t-c_g)	Price level changes attributable to share price performance on *equity* FI subsequent to date of grant	Recognise as an expense in the *equity* financing section of the note on operating income and credit the value of the FI in the balance sheet

context of the numerical illustration used in the previous section of the paper. The differences between the EM and the PEEM are highlighted by assuming a mixed settlement for EBC of a cash payment for 5m options (in this case £20m) while the other 5m options are to be settled on exercise by the issue of new equity shares. It is also assumed, for the purpose of exposition, that the principle of fair value at the date of acquisition applies. As in the previous examples for immediate cash purchase and for EBC settled in cash, asset valuation and operating expense recognition are identical irrespective of the method of settlement and amount to £3.9m and £0.78m.

5.1. Equity model: price level changes

In the EM, the reporting entity is 'the enterprise itself existing and operating as an economic unit separate and distinct from its owners' (FASB, 1990, para. 125). Transactions in ownership rights are not viewed as exchanges from which gains or losses accrue to the reporting entity. Rather, in granting equity rights in exchange for capital contributed the entity is under no obligation to deliver anything in return. Thus, EBC funded by the issue of new shares is classified as part of the equity residual and is accounted for differently from liabilities. New shares are valued at the consideration received, the exercise price, and there is no expense recognition. By the application of dirty surplus accounting, the capital contributed by existing shareholders to finance the acquisition of resources is, in effect, netted against the cost of the resources consumed and there is a zero sum impact on the value of the equity residual. The gain to the supplier of the resources is offset by the loss to pre-existing equity. For cash-based settlement, however, resources leave the enterprise and an expense is recognised equal to the difference between the cash payment less the exercise price. The result is that in the EM, in general, and in FAS123 in particular, whether price effects subsequent to the date of measurement are recognised as expenses depends on whether EBC is settled in cash or by the issue of equity. Conventional accounting practice is based on the EM with no expense recognition. As illustrated in column 2, Table 4, the reporting outcome for all equity settlement is identical to a firm that has no EBC funding.

Given the application of fair value accounting at

Table 4
Models of the reporting entity and equity based consideration
Incremental impact of EBC on operating income

Operating activity	Year 1 *Method of Settlement & MRE*					Total to year 5 *Method of Settlement & MRE*		
	Cash	Equity		Mixed		Cash	Mixed	Mixed
	1	2	3	4	5	6	7	8
	EM/PEEM	EM¹	PEEM	EM²	PEEM	EM/PEEM	EM	PEEM
Expense	(0.78)	0	(0.78)	(0.78)	(0.78)	(3.9)	(3.9)	(3.9)
Operating profit	(0.78)	0	(0.78)	(0.78)	(0.78)	(3.9)	(3.9)	(3.9)
AEM income (Paton)								
Financing activity								
Price level changes on EBC *liability* instruments $(c_t - c_g)$	(11.31)	0	(11.31)	(5.655)	(5.655)	(36.1)	(18.05)	(18.05)
EM income (FASB)				**(6.435)**	**(6.435)**		**(21.95)**	
Price level changes on EBC *equity* instruments					(5.655)			(18.05)
PEEM income (ASB)	**(12.09)**	**0**	**(12.09)**		**(12.09)**	**(40.0)**		**(40.0)**

	Balance sheets						
	Cash	Equity		Mixed Settlement		Mixed Settlement	Mixed Settlement
	1	2	3	4	5	After exercise (EM)	After exercise (PEEM)
	EM/PEEM	EM¹	PEEM	EM²	PEEM		
Profit & loss account	(12.09)	0	(40)	(6.435)	(12.09)	(21.95)	(40)
Equity financial instrument				1.95	7.605	6.95	25
Equity capital	(12.09)	0	(40)	(4.485)	(4.485)	(15)	(15)
Liability	15.21	0	0	7.605	7.605	0	0
	3.12	0	(40)	3.12	3.12	(15)	(15)
Assets	3.12	0	(40)	3.12	3.12	(15)	(15)

Income statement: Cash: cash settlement for 10m options
Equity: issue of equity in settlement of 10m options
Mixed: mixed settlement of 5m options in cash and 5m by issue of shares.
EM¹: Non-recognition of expense for EBC in conventional accounting practice
EM²: Recognition of date of grant fair value for equity funded EBC (FAS123, FASB, 1995)

the date of grant, the results of accounting for EBC, funded half by the issue of new equity and half by cash payment are described in Panel C of Table 3 and illustrated in column 4 Table 4. By adopting expense recognition based on the date of grant fair value of resources acquired, consistency is obtained with the earlier illustrations and with the FAS123 recommendation. For the EM, only the price change on the cash based (liability) component of EBC is recognised as an expense, in this case £5.655m at the end of year one and £18.05m on the date of exercise. In the EM balance sheet (column 4, Table 4), initial recognition of the fair value of resources results in the recording of an equity financial instrument of £1.95m (0.5* £3.9m). Following exercise, the value of the equity finan-

cial instruments is given by the date of grant value of the resources plus the exercise price (£1.95m + £5m). The value of the liability component of EBC is recorded initially on the date of acquisition at £1.95m, at £7.605m (£1.95m + (0.5* £11.31m)) at the end of year one and at £20m on the date of exercise. Following exercise, the adverse funding impact of £15m comprises £20m paid in cash settlement less the exercise price received of £5m.

In the EM, expense recognition depends on the classification of EBC as either equity or debt. Changes in the value of EBC financed by new equity between the date of grant and the date of exercise are not recognised as expenses. However, as has already been established, the different treatment of price changes on equity and liability in-

struments undermines the provision of reliable, relevant and comparable information in financial statements. In particular, differential expense recognition, based on the choice of financing methods, creates the scope for earnings management and serves to undermine managerial accountability for the outcome of financing decisions.

5.2 'All equities' model: price level changes

In the 'all equities' model (AEM) proposed by Paton (1922) the boundary of the reporting entity includes all the securities that fund the activity of the enterprise. For the purpose of measuring income, no significance attaches to the distinction between debt and equity. In the AEM, wealth transfers between 'equities' have a zero impact on income and are accounted for as appropriations. In the case of accounting for EBC, the application of the principle of fair value at the date of acquisition gives rise to an annual charge for operating cost (£0.78m) that is the same for cash and equity settlement. Dirty surplus accounting, however is applied to price changes on all EBC irrespective of the method of settlement. Price changes for equity funded EBC are ignored while those for cash settlement are treated as appropriations. Arguably, the uniform recognition of price changes on all EBC is consistent with the spirit of the AEM. This can be achieved by the application of fair value recognition of new equity on the date of exercise. However, in this case the impact on operating profit will be understated. In the context of the data presented in Table 4, AEM with fair vale recognition for equity at the date of exercise is the same as for cash settlement (column 1) except that the impact of the price change (£11.31m) would an appropriation of profit rather than an expense.

5.3. Pre-existing equity model: price level changes

The distinguishing feature of the PEEM is that the interest of pre-existing shareholders is identified with the business entity. In this model, ownership rights are viewed as valuable to the entity because they may be used to acquire assets, as is the case for the example of a computer operating system used in this paper. Transactions in ownership rights are viewed as *exchanges* involving a commitment to deliver resources of value to the entity. The effect, with the exception of pre-existing equity, is to account for all financial instruments as if they were liabilities. Consequently, changes in the value of liability instruments, subsequent to the date of measurement, are recognised as expenses in measuring the income of pre-existing equity. The accounting entries are the same as for all cash settlement (Panel B, Table 3 and column 1 Table 4). In Table 3 and columns 3 and 5 Table 4, full expense recognition for EBC results in a charge of £12.09m in year one and £40m in

year five. In the PEEM, the full cost of EBC is recognised as an expense irrespective of whether EBC is funded by cash or equity or a mixture of both. In all cases the clean surplus loss is £12.09m at the end of year one and £40m at the end of year five. Compared to the EM, periodic income and return on capital employed is lower in the PEEM and reflects the change in the wealth of pre-existing shareholders in the firm. In the context of value-based management, the significance of a single period measure of (residual) income that reflects the change in shareholder wealth has recently been highlighted for management accounting by Bromwich and Walker (1998) and O'Hanlon and Peasnell (1998), and for financial accounting by Forker and Powell (2000). A comparison of the characteristics of different MRE is provided in Table 5.

6. Authoritative UK guidance on EBC related issues

The implications of the analysis of this paper for the consistency of UK guidance on accounting for issues related to EBC is now examined.

6.1. Fair values in acquisition accounting (FRS7)

Increasingly, EBC features in the financing of corporate acquisitions. The Companies Act (1985, Schedule 4A: para. 9(4)) defines acquisition cost as cash plus the fair value of other consideration. In the case of determining the fair value of contingent consideration (either equity or liability financed) FRS7 (ASB, 1994: para. 81) requires an estimate of the total amount payable with subsequent revisions to reflect the resolution of uncertainty. This is consistent with full cost recognition under the PEEM. However, application of full cost recognition in practice is undermined by the Companies Act requirement that the share premium is calculated by reference to the cash received (exercise price) rather than the fair value of the new shares issued. In the case of EBC funded by the issue of new shares FRS7 (Appendix 1: para. 6) requires dirty surplus accounting. The difference between the fair value at the date of exercise and the exercise price has to be excluded from the calculation of goodwill and charged directly against consolidated reserves. The numerical example used in this paper applied to the purchase of a company, rather than a computer processor, valued at £3.9m can be used to illustrate the effect. The fair values of the consideration paid and net assets acquired are £50m and £3.9m respectively. Goodwill, calculated by reference to the £10m exercise price is £6.1m (£10m–£3.9m) and £40m is charged directly against reserves. In effect, the EM is applied in order to satisfy the legal form of the transaction. Consequently, the economic substance of the transaction is ignored and choosing between

Table 5
Comparison of models of the reporting entity

Characteristic	'All Equities' Model (AEM)	Equity model (EM)	Pre-existing equity model (PEEM)
Boundary of the model of the reporting entity (MRE)	All funding instruments	Equity instruments, including rights to contingently issueable shares	Existing equity shareholders
Income measurement and capital structure	No distinction between debt and equity	Debt and equity separately classified	All funding instruments, except existing equity classified as liabilities
Accounting for wealth transfers within the boundary of the MRE	All transfers are netted with zero impact on income	Intra-equity transfers are netted, but price changes on liabilities are recognised in the income statement	All wealth transfers are recognised in the income statement
Clean surplus accounting	No	Yes for liability instruments. No for equity instruments	Yes

equity or liability EBC funding results in differential expense recognition for amortised goodwill (FRS10, ASB, 1997).

6.2. Accounting for provisions and contingencies (FRS12) and earnings per share (FRS14)

Provisions and contingencies are accounted for as types of liabilities arising from obligations of an entity to deliver economic benefits arising from past events that are characterised by differing degrees of uncertainty. The boundary of the entity, in terms of whether EBC financed by new equity is classified as a liability or as equity is not defined in FRS12 (ASB, 1998). There is no specific mention of accounting for EBC in FRS12. The implication is that new equity to be issued to finance EBC is not viewed as a contingent liability that gives rise to expense recognition in the event of the likely exercise of the EBC. This view is consistent with the EM. However, it is also the case that for cash-based settlement of EBC, the expense recognition and disclosure requirements applicable to provisions and contingencies ought to apply, but this is not acknowledged.

Application of the EM, for EBC funded by new equity is further reinforced by the guidance provided on accounting for earnings per share in FRS14 (ASB, 1998). Here, accounting for share options, warrants and contingently issuable shares is fully addressed in terms of the calculation of diluted earnings per share. The purpose is to reflect the effect on earnings per share as if the conditional rights to subscribe for shares were exercised. The method applied is to increase the number of shares in the denominator to reflect the dilution in EPS that would be incurred. In terms of manage-

rial accountability, disclosure of diluted EPS for EBC settled by the issue of new equity, is a substitute for expense recognition. In the PEEM, the cost of dilution is recognised as an expense and is included in the calculation of basic EPS.[20]

6.3. Accounting for capital instruments (FRS4)

Warrants have similar characteristics to equity funded EBC in terms of dilutive effects, although typically they are used to raise capital rather than directly fund the acquisition of resources. Recognition of operating expenses does not arise and the issue is whether to separately recognise price changes as financing gains (losses). Although accounting for warrants and options is explicitly excluded from FRS4 (ASB, 1993: Appendix III, para.13), guidance on some aspects of accounting for warrants has been provided by the ASC and the ASB. Since the issue of Technical Release 677 (ASC, 1987: para. 4) there has been consistent guidance on how to account for the premia on warrants that expire unexercised. In accordance with the PEEM, any premia is to be released from shareholders capital and credited to income. In the context of FRS3 the credit is to appear in the *Statement of Recognised Gains and Losses* (FRS4, 1993: para.47). Consistent with the PEEM, the justification advanced in FRS4, and supported by a majority of the ASB, was that warrant holders were not owners and thus the owners benefited when options lapsed. (FRS4, Appendix III: para. 12).

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[20] The relative merits of expense recognition compared to disclosure of diluted EPS is proposed in Wiseman, (1990, 1992) and challenged by Cheung (1992).

Consistent application of the PEEM is, however, breached by the requirement in FRS4 that the amount recognised for the warrant at the date of grant should not be subsequently revised to reflect changes in its value (FRS4: para. 45). In effect, warrants are not to be marked to market as if they were liabilities as would be the case for current cost accounting under the PEEM. If exercised, they are valued at the premia plus the exercise price. This is consistent with the EM. On balance the accounting treatment in FRS4 is income boosting and fails to adhere to a single MRE. If warrants lapse, gains on expiry are credited to income (PEEM) but dilution of pre-existing equity caused by share prices rising above exercise prices are not recognised as losses (EM). To summarise, there are a number of inconsistencies in current guidance for EBC and related transactions that undermine the provision of relevant and reliable information.

7. Recommended accounting practice

The analysis of this paper has identified the superiority of the PEEM over the EM in providing useful information when accounting for EBC and, in particular, ESS. This contrasts with the FASB's reaffirmed decision (FASB, 1990) to apply the EM when accounting for EBC (FAS123). In the absence of supporting empirical evidence, the case in favour of PEEM is not yet conclusive. To make progress, a form of reporting is recommended in this paper to accommodate the three main MREs. This results in the provision of full information for EBC and requires the application of fair value accounting over the life of EBC. First, at the date of acquisition, in order to report expense recognition equivalent to immediate cash payment, then subsequently by marking to market subsequent price changes to recognise the cost of unhedged exposures to share price increases. For the purpose of evaluating and appraising managerial performance, income reflects the change in the wealth of

existing shareholders. Two further features are worthy of note. The reporting method provides a full accounting for owners' equity, in particular, for wealth transfers between security holders.[21] Also, full information is provided on the impact of EBC on financial leverage.

The recommended approach requires the application of the PEEM. As a secondary feature income according to the AEM and EM is provided in the form of supplementary information. The comprehensive nature of the approach is most clearly demonstrated when accounting for mixed settlement of EBC as described in Panel B Table 3, and illustrated numerically in column 5 of Table 4. In the income statement full details for EBC can be disclosed by highlighting three components of the expense. First, the base charge (£0.78m) for the operating expense equivalent to immediate cash payment provides AEM income. The distinction between debt and equity is maintained and provides details of EBC price changes for liability financial instruments (£5.665m) which allows the reporting of EM income. The final component is the price changes on EBC to be settled by equity (£5.665m) to give PEEM income. In the balance sheet, equity and liability financial instruments are separately identified to provide full information.[22] The overall outcome is that users of financial statements are free to choose the MRE that is best suited to their purposes.

The recommended approach has the merit of wider application beyond accounting for EBC. Accounting for warrants and convertible loan stock give rise to wealth transfers between those funding the activities of an enterprise, and these can also be separately identified to provide full accountability for managerial financing decisions. Although fixed interest investments do not give rise to wealth transfers, changes in interest rate expectations cause value changes that have the characteristics of windfalls. This issue is particularly important when accounting for insurance and other financial companies (Horton and Macve, 1996, Klumpes, 1999). The current debate is framed in terms of either recognising the value change as part of income (Hicks I) or treating these as capital and by dirty surplus accounting taking them directly to reserves (Hicks II). Application of the method advocated in this paper accommodates both approaches. In the case of financial institutions, net interest income provides the basis for measuring operating profit (Hicks II). Separate identification of windfall price effects provides users with comprehensive income (Hicks I) in accordance with the PEEM.

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[21] When reviewing the relative merits of the EM, the FASB acknowledged the need to provide owners with an account of their own equity interest (FASB, 1990: para. 126). No guidance was provided, however, as to how this need might be satisfied.

[22] It is increasingly common for management to cap the exposure of pre-existing equity to the cost of EBC by setting up ESOP trusts to hold shares either purchased in the market or by issuing new shares prior to exercise. The effect is to deliver holding price gains that, in the appropriate financing section are credited against the price change expense recognised as the corresponding debit to the revaluation of the financial instrument in the balance sheet. The corresponding debit for the holding gain is the revaluation of the shares held in trust that are reported as an asset in the balance sheet (ASB, UITF Abstract 13).

8. Conclusions

Conventional accounting practice for EBC, and in particular ESS, is unsatisfactory for a number of reasons. First, expense recognition depends on the method of settlement. If new shares are issued at the date of exercise, the most commonly adopted method, there is no expense recognition for the services acquired. If, however, settlement is in cash, either by purchase of shares in the market, or by payment of the difference between the share price at the date of exercise and the exercise price, then an expense equal to the net cash outlay is recognised. Management has scope to manipulate periodic profit by the choice of funding method. Current accounting practice, provides an incentive for management to choose equity settlement. This overstates profit and undermines managerial accountability for resource consumption that is paid for by diluting the equity of existing shareholders.

The analysis of this paper is based on the application of fair value accounting during the life of an option. Date of grant fair value provides the basis for expense recognition equivalent to the amortised charges that would result for immediate cash payment. Subsequent changes in the value of EBC are reported separately as operating expense so as to reflect the impact of choosing not to hedge the impact of share price rises on EBC. Fair value recognition of equity funded EBC together with clean surplus accounting is justified in terms of the qualitative characteristics of financial information set out in the ASB's *Statement of Principles* (ASB, 1999c: ch. 3). Comparability is satisfied where identical resource consumption results in an identical measure of operating performance irrespective of the method of financing the acquisition of the resources. Accounting practice that, for example, recognises operating expenses for cash-based methods of financing but ignores it for EBC funded by the issue of new equity, serves to undermine the reliability and relevance of financial information. Failure to recognise an operating expense for the consumption of resources financed by new equity issued on terms that dilute existing equity contravenes the characteristics of faithful representation, neutrality, completeness and prudence. Similarly, any focus on operating performance as an important component of earnings prediction is undermined by partial recognition of operating expense based only on cash-based methods of funding.

There are three main approaches to accounting for EBC. These are based on models of the reporting entity that differ with respect to the defined boundary of the residual equity. Conventional practice is based on the EM which has been adopted by FASB as the basis for its conceptual framework. The main alternative is the PEEM which the ASB favoured, before the setting up of its project on accounting for equity, in its draft *Statement of Principles*. The PEEM ignores the distinction between equity and cash settlement for EBC and gives rise to uniform expense recognition irrespective of the method of funding. A third less acknowledged alternative is the 'all equities' model advocated by Paton. This also measures income independently of the method of settlement but applies dirty surplus accounting to all wealth transfers between the security holders funding the activity of the firm.

In the conventional application of the EM, fair values for EBC funded by new equity are not recognised either on the date of grant or at the date of exercise. New equity is valued at the consideration received, which is the exercise price. Non-recognition of expense for EBC funded by new equity is achieved by the application of dirty surplus accounting. The capital contributed by pre-existing shareholders, in the form of equity dilution as the result of issuing equity for less than fair value is, in effect, netted against the payment for services consumed. The FASB's application of the EM is modified in FAS123 to allow recognition of the fair value date of grant cost of EBC. It remains the case however, that dirty surplus accounting is applied to price changes on equity funded EBC subsequent to the date of grant. Thus the EM, as modified by FAS123, is subject to similar shortcomings as conventional practice.

The PEEM requires application of date of exercise accounting and complies with clean surplus accounting with the result that the full cost of dilution suffered by pre-existing shareholders is recognised as an expense. A possible limitation of the PEEM however, is that for the purpose of accounting for EBC, there is no distinction between liability and equity settlement. Potentially, this results in a loss of information that may impair assessment of financial leverage. Second, while there exist strong grounds to assert the superiority of the PEEM over the EM this cannot be considered conclusive in the absence of supporting empirical evidence. Finally, the commitment of the FASB to the EM merits consideration. Accordingly, a method of reporting EBC is recommended in this paper that reports PEEM income, but also recognises the difference between equity and cash settlement. Full information according to the AEM, EM and PEEM can then be displayed as a note to operating profit. At this stage in the evolving debate on accounting for EBC, the recommended presentation provides a vehicle for users of financial statements to assess the relative merits of different MRE. Finally, a review of current guidance on accounting for EBC in the UK demonstrated the need for a clear understanding of the significance of MRE choice in order to ensure consistent and reliable provision of useful information.

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The use of biodata in the pre-selection of fully-accredited graduates for chartered accountancy training places in Scotland

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Abstract – The aim of this paper is to critically evaluate whether biodata could be used as a valid tool in the pre-selection process of trainee chartered accountants. Biographical details of recently qualified accountants, who trained within the whole spectrum of ICAS training offices, were collected from a self-completion questionnaire. The data collected were used to develop statistical models predicting the ability to pass the ICAS examinations at the first attempt. The validity of the developed models for use within the Scottish chartered accountancy profession was then evaluated. A rational approach was adopted through the formulation of a conceptual framework. General background areas were hypothesised to be relevant in the determination of ICAS examination success, and within these general areas specific factors were highlighted and entered into a logistic regression model using data from trainees who qualified in the years 1993–94. Statistically significant models were developed for fully-accredited honours (n=149) and ordinary graduates (n=225) and these models continued to retain their validity when applied to trainees who qualified in 1995 as demonstrated by the reported tetrachoric correlation coefficients (honours graduates, 0.48, and ordinary graduates, 0.42). This paper has therefore identified that a rationally derived model based on biographical information can be used to differentiate between fully accredited trainees who pass their examinations at the first attempt and those who experience failure. This work calls into question many of the current pre-selection practices used by the training providers and provides training principals who employ fully-accredited graduates to undertake ICAS training with a useful pre-selection tool. **Key words:** graduate selection, biodata, chartered accountancy, training places.

1. Introduction
Ferguson and Hatherly (1991) suggest that human resources are the life-blood of the modern chartered accountancy profession, whose future will depend on its ability to attract, train and retain the best and most capable people (Nelson, 1989; Ainsworth et al. 1990). Training a chartered accountant involves a substantial outlay (Harvey-Cook and Taffler, 1987; Tirbutt, 1989; Gammie, 1999a). This cost encompasses both actual and opportunity costs,[1] and each of these costs rise if the graduate fails to proceed through the examination system without resits, or in fact fails to qualify as a chartered accountant altogether. Not surprisingly, firms consider the ability to pass the examinations as of critical importance (Cameron, 1991). Indeed, one multinational firm stated in their recruitment brochure, 'Exam training, however, will be your first priority: your key objective (and ours) is to keep passing your professional examinations at the first attempt' (Touche Ross:12).

This paper therefore defines a successful trainee as one who passes the Institute of Chartered

Accountants of Scotland (ICAS) professional examinations first time. While it is appreciated that this definition of success is only one of many factors that will create a successful appointment, if trainees fail to negotiate the examination hurdle then they can never proceed to demonstrate their full worth to the organisation.

1.1. The recruitment and selection issues for the accountancy firm
Despite changes in both demographic trends and university funding (Herriot, 1989) there is no shortage of graduates to fill chartered accountancy training places. Training providers are therefore facing the problem of how to select the most suitable graduates from the pool of fully accredited and non-relevant graduates that apply to their training organisation.

Accountancy firms tend to rely on traditional methods of selection, by pre-selecting prospective

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The final version of this paper was accepted in May 2000.

[1] The total training cost (specifically related to the training contract) of a fully-accredited graduate amounts to around £14,000 and this increases quite significantly to around £28,000 for a non-relevant graduate. These estimates (further details of which are available from the author) do not take into consideration the cost of 'on the job' training and this aspect may in fact be the most expensive for the firms. Indeed some of the 'Big 5' indicate that 'the current estimate of investment per student over the three years is £100,000' (KPMG:23).

trainees on the basis of their Universities and Colleges Admissions Service (UCAS) points and application forms before relying on interviews which are often unstructured (Harvey-Cook and Taffler, 1987; Gammie, 1996).

1.1.1. Application form pre-screening

The initial reliance on the application form for pre-selecting candidates is not unique to chartered accountancy firms. Indeed, Bevan and Fryatt (1988) found that 90% of respondents in their IMS survey used application forms, with 81% using the forms to filter out unsuitable candidates. Similar results were reported in an IRS survey conducted in 1996 whereby 85.8% of organisations in the UK were found to recruit graduates using application forms as a method of selection. Wingrove, Glendinning and Herriot (1984), however, questioned the validity of the application form sift. They suggested that unless organisations could demonstrate a relationship between the information contained in the application form and future job performance, pre-selection would appear haphazard and unsystematic, resulting in unreliable pre-screening. This is a concern echoed by Harvey-Cook and Taffler (1987) for the accountancy profession. They found that only 10% of accountancy firms in their sample of London firms used a structured checklist scoring system as a decision aid for assessing applications, and no firms were using formal statistical methods at the pre-selection stage. Pre-selection would therefore appear to be intuitive and not based on any statistical methodology (Harvey-Cook, 1995).

1.1.2. The interview

Previous research in managerial selection (Robertson and Makin, 1986) and managerial/graduate selection (Shackleton and Newell, 1991; IRS survey, 1997) demonstrated that the interview remained the dominant method of selection in the UK. These findings were mirrored by work on graduate selection for the accountancy profession, whereby Harvey-Cook and Taffler (1987) and Gammie (1996) found that all respondents used interviewing in some form. This is despite the unfavourable research evidence (Schmitt, 1976; Arvey and Campion, 1982; Herriot, 1984; Anderson, 1992; Anderson, 1997) which questions the validity of the interview as a selection technique. Indeed, Herriot (1984) states: 'Judged by the acid test of psychometric efficiency – that is, its validity – the selection interview is a miserable failure' (p. 69). This should be of concern to the accounting profession for if the application presift is '.....cursory, the reliability of the recruitment process is almost exclusively focused on the interview result.' (Harvey-Cook, 1995:18). Several studies, however, have shown that the reliability and validity of the interview can be raised when an interview schedule or guide is used (Keenan and Wedderburn, 1980; Herriot and Rothwell, 1983; Huffcut and Arthur, 1994; McDaniel et al. 1994; Conway et al. 1995). Harvey-Cook and Taffler (1987) found, however, that only 44% of chartered accountancy offices, in their study, used a structured interview methodology.

1.1.3. Other assessment methods

Other methods of assessment are used by professional firms, such as testing (personality, job-related, cognitive), group discussion exercises, situational inventories or assessment centres utilising a variety of testing procedures. Gammie (1996), however, found that very few ICAS training offices utilised other techniques apart from the traditional interview. A minority, only 20%, used some form of testing as a selection technique and this was restricted to the larger firms. Gammie (1996) therefore concluded that the profession since the Harvey-Cook and Taffler (1987) study had made little progress. When the data on graduate selection from the IRS (1997) study is considered, 43.3% of recruiters used some form of testing. It would appear that the accountancy profession is lagging behind the recruiters of graduates in general. It must be noted, however, that four years have elapsed since the Gammie study was conducted and more accountancy firms may now be utilising testing in some form.

1.1.4. Summary

Accountancy firms receive far more applications from candidates than the number they wish to interview. This necessitates some form of reliable and cost effective filtering process. Accountancy firms pre-select prospective trainees on the basis of their application forms, before relying on the traditional interview, despite the research evidence questioning the validity of the interview as a selection technique. Only a minority of firms utilise more advanced techniques such as testing.

1.2. The use of biodata

England (1971) suggested that the information contained in an application form could be used actuarially. This would involve collecting data from a large number of recruits and relating this statistically to the criterion of interest, which in this study is the ability to pass the ICAS examinations at the first attempt. If the weights established from the statistical analysis of the background factors are relatively constant over time, then the resulting model could be used to sift later application forms on a routine basis. The technique of using information in this manner is known as biodata. By objectively scoring biographical information that is demonstrated to be related to some aspect of

success in an occupational pursuit, biodata can be regarded as a 'predictor' for the 'criterion' of success. Indeed, Hunter and Hunter (1984) in their meta-analytical study confirmed the relative superiority of biodata (mean validity of 0.37), for the selection of staff for entry-level jobs where training will occur after hiring. In comparison, conventional selection measures such as the interview scores 0.14, references 0.26 and academic achievement 0.11.

Harvey-Cook and Taffler (1987) first proposed the benefits from the utilisation of this technique for accountancy firms. They suggested that biographical details on an application form, processed by an appropriately developed statistical model, could 'represent a very powerful predictor of job performance' (p. 104). This is a view supported by Stokes and Reddy (1992), who suggested that biodata should provide employers with 'less biased information in a more economical fashion' (p. 288). Indeed, Gratton (1989) suggested that the adoption of statistical procedures to process biodata at the pre-selection stage was the best method for pre-selecting graduates for entry-level jobs. Harvey-Cook (1995) therefore developed a biodata model examining the determinants of the Institute of Chartered Accountants in England and Wales (ICAEW) chartered accountancy examination success from information commonly found on an application form. However, biodata is not without its critics. One of the main criticisms of biodata is the lack of generalisability for a particular biodata key (Gunter et al., 1993), and a primary concern is the degree to which biodata models are generalisable across organisations and jobs (Stokes and Reddy, 1992). Hunter and Hunter (1984), for example, provided evidence that biodata does not travel well from one setting to another, and this was supported by Reilly and Chao (1982), although Rothstein et al. (1990) indicated that it was possible to develop biodata models which can be generalised across organisations. These studies raised questions about the validity of any model developed in an ICAEW setting applied to that of an ICAS setting. This, compounded by the differences between the education systems, both at school and higher education,[2] necessitated developmental work within a Scottish context, which was undertaken by Gammie (1999a).

Both studies utilised an empirical technique[3] to develop logistic regression models designed to identify, at the application form stage, those trainees who were likely to pass their chartered accountancy examinations at the first attempt. A summary of the key findings of these two studies is reported in Table 1.

Although both of these studies reported impressive classifications within the developmental group, considerable shrinkage was experienced

when the developed models were applied to a different data set for the validation group. This may be a derivative of the empirical approach adopted in these studies. Stokes and Reddy (1992) suggested that models utilising a rational approach[4] retained their validity in a superior manner to that of empirically derived models. The empirical approach has also received much criticism (Dunnette, 1962; Baehr and Williams, 1967; Pace and Schoenfeldt, 1977, Mitchell and Klimoski, 1982) for failing to advance any theoretical understanding of why the biodata items predict the criterion of interest. Biographical research in the last two decades has therefore increasingly been focused on a more conceptual framework (Stokes and Reddy, 1992). Another possible explanation for the shrinkage experienced by the ICAS model (Gammie, 1999b) may be due to the fundamental change that took place in the ICAS education system during the period of model development (1988 – 92). This timeframe encompassed a period of change in the ICAS education process[5] subsequent to which shifts in the nature of the reference group

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[2] Students who are studying in Scottish schools usually take 6–8 subjects in 4th year at Standard grade, which is a position mirrored south of the border. In 5th year, Scottish students usually undertake four to five subjects at Higher level, the results of which can gain university entrance. The 6th year is optional whereby students can undertake further Highers in other subjects or develop some of their 5th year subjects by undertaking Certificates of Sixth Year study (CSYS). These CSYS subjects are broadly equivalent to the English 'A' level, which are studied over two years and are taken in the final year at school. Students in higher educational establishments in Scotland can choose to progress down the ordinary degree route, graduating in three years, or down the honours route, graduating in four years. This contrasts with the English and Welsh system whereby students can obtain an honours degree in three years, and the ordinary degree as a chosen route is extremely rare; indeed, an ordinary degree is often classified as a failed honours degree.

[3] The empirical approach to biodata establishes relationships between the predictor items and the criterion measure purely on the statistical evidence presented, without necessarily any regard to the rationale behind the relationship.

[4] The rational approach to biodata assumes that there are clusters of behaviour which can be subsumed under different categories. Inventory items are selected a priori to measure constructs thought to be related to the criterion of interest. Thus, when significant relationships are obtained, they can be interpreted and understood.

[5] A two-tier examination system was introduced in 1988 for fully-accredited graduates (those graduates whose degree programmes have sufficient coverage of the ICAS foundation syllabus to exempt the students from the first level, which was called the professional level of the examination process). Non-relevant students could progress directly from University to their training firms but they were required to undertake a professional course and sit examinations at the professional level. Previously these students were required to undertake a conversion post-graduate course at University.

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Table 1
Key findings of Harvey-Cook (1995) and Gammie (1999a and 1999b)

	Harvey-Cook (1995)	Gammie (1999)
Examining body	ICAEW	ICAS
Size of training firm	Medium sized firms	All firms
Time period covered by developmental sample	Commencement of training contract: 1985/86	Commencement of training contract: 1983 - 88
Determinants of success	*All trainees* • No of A grade 'O' levels • 1st class or 2.1 degree • No art/lang A levels • BSc degree • Headboy/girl at school • Private sector education	*Honours graduates* • Honours classification • No of hours spent per week on outside interests • No of subjects taken at Higher to improve the grade • No of resits in 2nd year at University • Relevance of degree *Ordinary graduates* • No of resits in 2nd year at university • No of A grades at O level • No of UCAS points • No of subjects taken at Higher to improve the grade
Correct classification of developmental sample	74%	*Honours graduates* 73% *Ordinary graduates* 64%
Validation group#	0.318^	*Honours graduates* 0.27* *Ordinary graduates* 0.23*

Note
\# no validation work was undertaken in the Gammie ICAS monograph (1999a), however this additional work was carried out in the PhD (1999b).
^ the point biserial correlation coefficient was calculated in the Harvey-Cook (1995) study
* the tetrachoric correlation coefficient was calculated in the Gammie (1999b) study

have taken place.[6] This could render the biodata key to be increasingly less effective (Thayer, 1977). Further work is therefore required within an ICAS setting, subsequent to the changes in the educational system, through the adoption of a more rational method of model development.

The aim of this paper is to further advance the work of Harvey-Cook (1995) and Gammie (1999a) by developing statistical models which could be used by training providers who recruit fully-accredited graduates to undertake the ICAS system of training. The models should be used as a pre-selection tool, utilised at the application form stage, to narrow down the number of applicants to a manageable level for the next stage in the selection process. Thus, it is not envisaged that the models should replace the current selection process in its entirety, but rather provide a statistical base on which to make the initial selection.

This paper will outline the method utilised for the development of the biodata models, before building a conceptual framework from which the model development takes place. The models will then be validated prior to a comparison with other studies and selection techniques. The limitations of the work will be discussed together with the consideration of any gender issues necessary for a practical selection tool. The paper concludes by highlighting the implications for the training providers.

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[6] Non-relevant students appear to perform better in the examination process, which in the past was not the case (Gammie, 1999b). There is also an increasing trend of more non-relevant students being recruited by the accountancy firms, although the majority of students are still recruited from a fully-accredited background.

2. Method

Data for both the criterion measure, namely, ICAS examination performance,[7] and the explanatory background factors (the independent variables), were collected by a self-reporting mail questionnaire. This was sent to the complete population of trainees, as identified by the membership records of ICAS, who had qualified in the years 1993 (n=405), 1994 (n=393) and 1995 (n=395). The responses from the 1993/94 trainees (n=549, a 69% response rate) were used for the developmental work, with the responses from the 1995 trainees (n=262, a 66% response rate) used for the validation work.

Despite the criticisms levelled at the empirical approach to biodata development, some biodata researchers (Mitchell and Klimosky, 1982; Mumford and Owens, 1987; Drakeley, 1989) continue to advocate that empirically keyed background data scales remain the most effective predictor of a particular criterion performance. The approach of this paper therefore follows that advocated by Mael (1991), who suggested a hybrid approach, which he termed 'rainforest empiricism' (p. 721). This method utilises 'theoretical discretion' (p. 721) by restricting the predictor items, for the empirical keying exercise, to those that have some a priori rationale for a relationship with the criterion of interest. There is, therefore, limited reliance on statistical associations at the outset, and only those background factors which have a theoretical justification for inclusion will be entered into the model. This may lead to a conservative model as it will not necessarily pick up all the most influential background factors in the developmental sample. It should, however, result in a more meaningful derivation key as it will fail to recognise idiosyncratic factors, which are only relevant for the developmental group. Therefore, in an endeavour to identify the underlying reasons for ICAS examination success a modest conceptual framework was developed, which drew on the accumulation of evidence derived from the literature. General hypotheses were formulated about the characteristics of those trainees who pass their examinations at the first attempt, in contrast to those trainees who experience failure. Arising out of these hypotheses, specific background factors were identified and entered, using SPSS, into a statistical model utilising the technique of logistic regression. The developed model could then be used to estimate the probability of a trainee passing his/her ICAS examinations at the first attempt, by weighting the independent variables and creating a score for each trainee (Norusis, 1992). The potential for multicollinearity which may adversely affect the reported model (Pindyck

and Rubinfeld, 1987) was also examined by calculating Spearman correlation coefficients to ensure that there were no pairwise correlations of greater than 0.7 (Gunst and Mason, 1980) between the entered variables.

In order to focus on the unique features of the Scottish secondary school education system (see footnote 2) the decision was taken to exclude any trainees who had studied A levels at school (n=47) as opposed to the Scottish Higher. While it is recognised that this will result in a loss of data, it is necessary in order to consider academic performance at school at the end of the 5th year as this is the last school year for many Scottish students. Harvey-Cook (1995) also reported the importance of honours classification in the ICAEW study. As students who study in Scotland can choose to progress down an Ordinary degree route, thereby completing their degree in three years[8] (usually a failed honours degree in England and Wales), or decide to stay for a 4th year to obtain an Honours degree (usually completed in three years in England and Wales), it was also decided to develop separate models for Ordinary and Honours graduates to reflect the different routes available (seven trainees failed to provide data on this variable and were therefore excluded).

Finally, separate models should be developed for fully-accredited and non-relevant graduates in order to accommodate the possible differences in background factors, which differentiate on the criterion for these two groups. However, as there were insufficient numbers on which to undertake the model development for both categories of non-relevant graduate[9] (Mumford and Owens, 1987; Hogan, 1994), the data set for model development was divided into two homogenous groups, namely, fully-accredited honours graduates (n=153) and fully-accredited ordinary graduates (n=240).

3. The conceptual framework

The information that is commonly found on an accountancy firm application form can be divided into eight broad personal background areas (Gammie, 1999b), namely:

- personal background;
- social background;
- academic performance at school;
- academic performance at university;
- experiential activities at school and university;
- extracurricular activities at school and university;
- holding positions of responsibility whilst at school and university;
- university background.

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[7] The criterion measure was coded as a dichotomous variable: 1 = pass all ICAS examinations at the first attempt, 0 = fail at least one subject in the ICAS examinations.

[8] Some of the best students opt for this route as they wish to fast track into the profession.

[9] Non-relevant honours graduates (n=73) and non-relevant ordinary graduates (n=29).

However, only three of these areas, namely; academic performance at school, academic performance at university, and experiential activities at school and university have been highlighted as appropriate for inclusion in a pre-selection model. The rationale for excluding the remaining background areas is discussed below.

3.1. Personal and social background factors

Personal and social background factors have been excluded from the model development on the grounds that much of the data collected in these areas would not be appropriate for selection purposes. While the inclusion of many of these background factors may further develop our understanding of what determines ICAS examination performance, much of the data collected in these areas may be seen as intrusive by applicants. Indeed, pre-selecting employees on the basis of this type of information is not recommended by the Equal Opportunities Commission.

Gender is an area, however, which will necessitate some further thought. Although there is evidence in the literature that the academic performance of females is better than males in an accounting environment (Fraser et al. 1978; Hanks and Shivaswamy, 1985; Mutchler et al. 1987; Bayes and Nash, 1989; Tyson, 1989; Gammie and Gammie, 1995), many of the differences found within these studies are not statistically significant. Although the inclusion of gender in a model may explain why candidates do better than others in the ICAS examination system, firms will not be allowed to discriminate on the grounds of sex in their quest to recruit students who will perform well in the ICAS examination process. A variable that considers gender could therefore not be included in a selection model despite this background factor being a potential explanatory variable. However, if gender is highly correlated with examination success and hence an explanatory factor, problems still ensue for a selection model. The model will not be restricted specifically to the criterion of examination success, as there will be an inherent sex bias in the model, which could result in positive discrimination. However, as the significance level for the Mann-Whitney absolute Z score[10] was not significant for either the honours graduate gender variable or the ordinary graduate gender variable, it is evident that gender

is not a differentiating factor for ICAS examination success, and the criterion should therefore not be distorted with gender differences. The implications for the developed models on gender will, however, be considered later in the paper.

3.2. Extracurricular activities at school and university – holding positions of responsibility while at school and university

Despite the inclusion of background factors in these two categories by Gammie (1999a) and Harvey-Cook (1995), there would appear to be insufficient theoretical underpinning as to why involvement in extracurricular activities, or indeed holding positions of responsibility during school and university, would determine the ability to pass the ICAS examinations at the first attempt. These areas were therefore not considered in the models.

3.3. University background

With respect to university background, although ICAS statistics suggest that in general, graduates from 'traditional' universities will perform better in the ICAS examination process than graduates from 'new' universities, the type of university was not considered. It is suggested that any differences in ICAS examination performance may be due to the differential in quality of student intake, as measured by UCAS points, between the different types of institution as opposed to any 'value added' furnished by any particular type of institution. The minimum UCAS point requirements to enter into accountancy courses at 'traditional' universities are in the main higher than those of the 'new' universities. As any differential in performance arising from the difference in scholastic academic ability will be taken into consideration in the general background area of 'academic performance at school', another variable that considers type of university may not be necessary. This is supported by the non-parametric analysis undertaken on this particular background factor which revealed that the Mann-Whitney absolute Z score for the type of university variable ('traditional' university versus 'new' university) was not significant for either group of trainees.

Three hypotheses are therefore formulated in an effort to identify the constructs that underlie success or failure in the ICAS examinations. This should lead to the evolution of useful selection tools that will have practical benefits for the recruiting training firms.

3.4. Academic performance at school

Hypothesis 1: Strong academic performance at school will be indicative of success in the ICAS examinations

There is little disagreement in the literature that

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[10] The Mann-Whitney test is the non-parametric alternative to the more commonly known t test which is used in this instance to identify whether the background factor differentiates between those trainees who passed their ICAS examinations at the first attempt and those who experienced resits, but subsequently passed. The test calculates a Z score, which is a standardised normal deviate score. This score will be significant if the background factor does differentiate on the criterion of interest.

academic ability, measured by some dimension of academic performance at school, is indicative of academic performance in undergraduate accountancy courses (Dockweiler and Willis, 1984; Clark and Sweeney, 1985; Eskew and Faley, 1988; Gul and Fong, 1993; Tho, 1994). However, there are discrepancies over the type of academic performance that would appear to be of relevance for success in future accounting studies. Studies which examined success in the professional accountancy examinations (Marcus Dunn and Hall, 1984; Harvey-Cook, 1995, Gammie, 1999a) also point to the importance of previous academic performance, although it was recognised that school performance was only one aspect of scholastic ability and university performance was also of importance.

However, although there is obviously a theme prevalent in these previous studies, there is no definitive answer as to which particular aspects of school performance are important. It is therefore necessary to consider several aspects of school performance in an effort to identify the most salient measures for future performance. It was therefore decided to consider an overall measure for school performance as measured by a UCAS point score, which was restricted to 5th year achievement only. The rationale for this was that it would examine performance on a level playing field, by comparing academic performance over a stable time frame. This avoids comparing the UCAS point score of a trainee who left in 5th year with that of a trainee who stayed on at school until 6th year and took additional Highers or CSYS.

With respect to subsets of the UCAS point score variable, demonstrations of ability in analytical and numerical Highers were shown not to have as much importance as the overall UCAS score (Gammie, 1999a). This may be due to the fact that the fully accredited students are likely to have already identified a strength in these pertinent areas before pursuing an accountancy-based degree course. Despite the reliance that training providers place on both the grades in Mathematics and English at Higher level, these variables were also not included in the model building process, since the work of Gammie (1999a) suggested that these variables had little relevance in the determination of ICAS examination performance.

The variable to be entered into the fully accredited honours graduate model in respect of school performance will therefore be **the number of UCAS points achieved in 5th year at school**.

In light of the results of the Gammie (1999a) and the Harvey-Cook (1995) model, it was also decided to include a supplementary school variable that would consider the **number of O levels or Standard grades obtained at A pass or grade 1** for the ordinary graduate trainees.

3.5. Academic performance at university

Hypothesis 2: Strong academic performance at university will be indicative of success in the ICAS examinations

The literature suggests that university performance is indicative of future professional examination performance (Marcus Dunn and Hall, 1984; Harvey-Cook, 1995; Gammie, 1999a). The honours classification from a fully relevant degree is envisaged to be important in the determination of success in the ICAS examinations as it is suggested that this is a recent quantification of academic ability in a relevant area. The inclusion of this variable does, however, pose a problem. At the time of under-graduate selection by the training providers (usually in the October/November preceding the August start date), honours classifications are not known. This will be considered further later in the paper.

It has also been suggested that failure at university could indicate that a student has a particular problem with a subject area (Gammie, 1999a). As the majority of subjects that attract accreditation are taught in either the second or third year of an academic programme in accountancy, it can be suggested that resits in either of these years may be pertinent in the determination of future accounting examination performance.

The variables which are to be included for academic performance at university will therefore be: **the honours award achieved in the fully-accredited course** for the honours graduate model and **the total number of resits in second and third year at university** for both the honours and ordinary students.

3.6. Experiential activities at school and university

Hypothesis 3: Involvement in experiential activities at school and university will be indicative of success in the ICAS examinations .

Studies predicting undergraduate success suggest that previous related experience (Eskew and Faley, 1988) and previous knowledge of accounting (Gul and Fong, 1993) were significant for the prediction of student performance in accountancy at undergraduate level. It is therefore anticipated that trainees who have undertaken employment, particularly at University, which relates to chartered accountancy will be better prepared for the chartered accountancy office environment. These trainees may therefore not suffer from the same disillusionment that many trainees experience (Dean et al., 1988; Wilson et al., 1997). This may impact on their examination performance. A variable which will be included in both models will therefore be **job experience related to chartered accountancy while at school or university**.

Students who undertake fully accredited honours degree courses are most likely to have studied their

Table 2

Logistic regression models – fully-accredited honours and ordinary graduates

Variable	Trainees progressing from a fully-accredited honours degree			Trainees progressing from a fully-accredited ordinary degree		
	β	Level of signific-ance	Exp (β_n)	β	Level of signific-ance	Exp (β_n)
Honours award[12]	-1.3956	0.0005	0.2477			
Number of jobs related to chartered accountancy while at school and university[13]	1.1218	0.0033	3.0704	0.6545	0.0074	1.9241
Whether progressed directly from university to ICAS training[14]	1.6708	0.0450	5.3164			
Number of resits in second and third year at university[15]	-0.4032	0.4566	0.6682	-0.7143	0.0096	0.4395
Number of UCAS points obtained at Higher in 5th year[16]	0.0181	0.6013	1.0183	0.0148	0.5270	1.0149
Number of A passes or grade 1 passes at O level or standard grade[17]				0.1239	0.1201	1.1319
Constant	1.5421	0.3104		-0.9816	0.093	

Fully-accredited honours graduate model
Model chi-square 35.573(p=0.0001) with 5 degrees of freedom
Overall prediction classification 74.50% (see Table 3 for a further breakdown)

Fully-accredited ordinary graduate model
Model chi-square 21.375 (p=0.0003) with 4 degrees of freedom
Overall prediction classification of 61.33% (see Table 4 for a further breakdown)

accredited courses in the 2nd and 3rd years of their programmes. On completion of their 4th year degree, they will have experienced a break of at least one year from their core subject areas. If a further break is taken, by way of a gap year[11] for example, the technical areas covered at university and which are treated as assumed knowledge by ICAS may be out-of-date and no longer fresh in the trainee's memory. This could have a detrimental effect on the ICAS examination performance of the 'gap' honours graduate trainee. Ordinary graduates, on the other hand, complete their degree programmes at the end of three years with little time lag between

their core university subjects and their ICAS studies. A gap year was therefore not envisaged to have the same importance for ordinary graduates as it would simply put them in the same position as their honours degree counterparts at the end of the four years. A variable that identifies **whether a break is taken between the completion of the fully accredited degree programme and commencing ICAS training** was therefore considered only for the honours graduate model.

4. The fully-accredited models

4.1. The developmental work

Arising from the hypotheses set out above, five variables have been recognised as pertinent in the determination of ICAS examination success for fully accredited honours graduates and four variables for the fully accredited ordinary graduates. Before the variables are entered into the respective models, however, it is necessary to check for multicollinearity, in order to identify any variables that are too highly correlated with each other and which could invalidate the resulting model.

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[11] A gap year is a year taken out from the education system, which in this case would be a break between finishing the fully-accredited university degree and beginning the ICAS training contract.

[12] Coded: 1, 1st class honours; 2, upper second honours; 3, lower second honours; 4, 3rd; 5, unclassified degree.

[13] Coded: 1, 1 related job; 2, 2 related jobs etc.

[14] Coded: 1, yes; 0, no.

[15] Coded: 1, 1 resit; 2, 2 resits etc.

[16] Coded: 1, 1UCAS point; 2, 2 UCAS points etc.

[17] Coded: 1, 1 A pass or grade 1 pass; 2, 2 A passes or grade 1 passes etc.

Figure 1
Optimal cut-off point for fully-accredited honours graduates
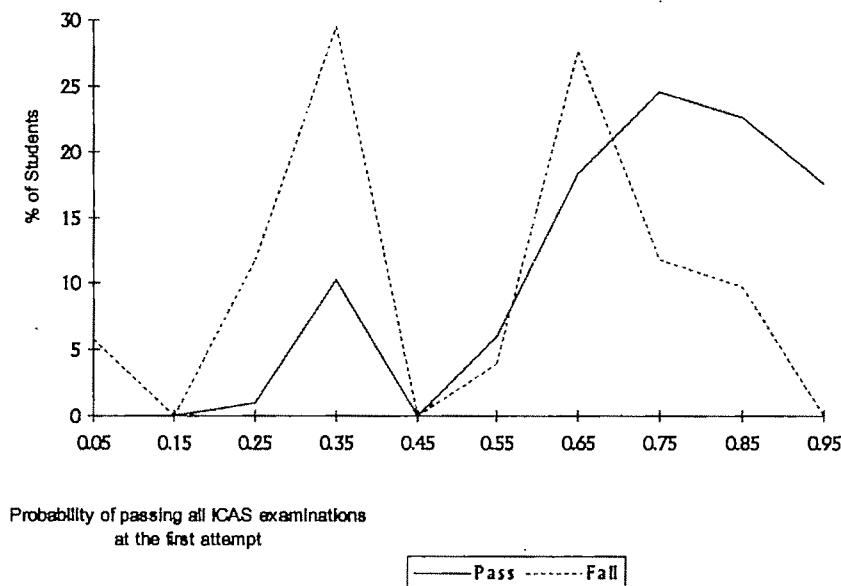
Spearman correlation coefficients were therefore calculated for the identified variables within each model[18] and were found to be below the multi-collinearity cut-off of 0.7 as discussed earlier. No variables were therefore excluded and all the identified variables were entered into their respective models.[19]

The resulting models which can be used to calculate the probability of a trainee who has progressed from a fully-accredited degree passing his/her examinations at the first attempt can be found in Table 2.

4.1.1. Discussion of the fully-accredited honours graduate model

In view of the results in the Gammie (1999a) study it is unsurprising to note that the honours award variable is the most significant background

factor. This demonstrates that the better the degree classification obtained from a fully-accredited degree programme, the better the chance of passing the ICAS examinations at the first attempt. This finding strongly supports Hypothesis 2. The second most significant variable is the number of jobs related to chartered accountancy while at school and university. This suggests that the more jobs undertaken which relate to chartered accountancy, the better the chance of passing the examinations at the first attempt. The next variable, which examined whether a trainee had progressed directly from university to their CA training, demonstrated that those students who progressed directly performed better in the ICAS examination process. The significance of these two variables in the model thus supports Hypothesis 3. The final two variables are not individually significant. The first of these was the number of resits in second and third year at university. The second relates to the UCAS point score obtained in 5th year at school. This lack of statistical significance in respect of school performance supports the work of Gammie (1999a), where it was noted that more recent academic performance has far more relevance than earlier school performance. There would appear therefore to be inadequate evidence to support Hypothesis 1.

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[18] The results can be obtained directly from the author.

[19] Although the total number of fully-accredited honours graduates was 153, there were four cases which had missing data for one of the pertinent variables. These four cases were therefore removed from the model building exercise, and the remaining 149 cases were then used for the honours graduate analysis. Likewise, 15 out of the 240 ordinary graduates had missing data for the relevant background factors and this reduced the ordinary graduate sample to 225 trainees for the analysis.

The strength of the model's explanatory power is demonstrated by the model chi-square (χ^2) of 35.6 (p=0.0001%). However, the crucial test for any model that is to be used for predictive purposes is its ability to predict. The utility of the model will therefore be based on the ability of the model to classify correctly, not only the subjects in the developmental group, but also, and more importantly, the subjects in the holdout group.

Before the classification of trainees takes place it is necessary to calculate the optimal cut-off point as advocated by Palepu (1986), as it may not be appropriate to classify trainees based on an arbitrary cut-off of 0.5.[20] The results are contained in Figure 1.

Figure 1 reveals that there are two optimum cut-off points, one at 0.57, and the other at 0.685. On examination of the probabilities calculated for this developmental sample, it was decided to set the optimum cut-off at 0.685, as this was the point at which there appears to be the greatest amount of observed and consistent distinction between the two groups. A classification was therefore undertaken based on classifying trainees as 'pass' trainees, if their calculated probabilities were 0.685 or higher, and 'fail' trainees if their calculated probabilities were less than 0.685. The results of the classification of the trainees based on this criterion are contained in Table 3. The classification figures have also been provided based on the arbitrary cut-off point.

Table 3 reveals that the overall prediction classification of 75%[21] as reported with the model in Table 2 is based on the arbitrary cut-off point of 0.5. This represents an excellent 89% of correct classifications of actual passes, but a poor 47% of correct classifications of actual fails. On the other hand, if the optimal cut-off point is utilised, although the overall prediction classification falls by 6 percentage points to 69%,[22] the model now classifies both successful and failure students in a

more even manner, with 69% of correct classifications in both categories. So although the Type I error[23] has increased from 11% to 31%, the Type II error has fallen from 53% to 31% based on the optimal cut-off point. There is now a more balanced classification of trainees, which may be more acceptable for a selection model.

4.1.2. Discussion of the fully-accredited ordinary graduate model

Discussing each of the variables in order of their statistical significance, it can be seen that the most significant of these variables is that which considers the number of accountancy related jobs undertaken while at school and university. The greater the number of jobs undertaken, the greater the likelihood of success in the ICAS examinations. This variable was also significant in the fully accredited honours model and Hypothesis 3 is once again supported.

Resits during the second and third year of a fully accredited degree programme is the next most statistically significant variable. This suggests that the more resits encountered at university, the less likelihood of passing the ICAS examinations at the first attempt, supporting the earlier work of Gammie (1999a). It is worth considering, however, why resits in second and third year have more significance for the ordinary students than for the honours students where the variable was not statistically significant (see Table 2). In general, it tends to be the weaker university students who progress down the ordinary route, and universities may encourage students who have had resits in the earlier years of a course not to progress to an honours degree. Therefore, fewer honours graduates will have experienced failure at university. There is also no real quantification of university performance for ordinary students as there is no honours award which differentiates between different levels of performance. Resits at university therefore become more relevant. It should be noted, however, that in both the fully accredited honours and ordinary models, some measure of university performance is significant, thus supporting Hypothesis 2.

The final two variables, which are not statistically significant, both relate to academic school performance. The first suggests that the greater the number of A passes or Grade I passes at O level or Standard grade, the better the chance of passing. The final variable indicates that the more UCAS points obtained at Higher the better the chance of success. The lack of statistical significance of these variables supports the findings of the fully accredited honours model, and suggests that once again, school performance does not have a significant impact on the determination of ICAS examination success. Hypothesis 1 is therefore not supported.

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[20] SPSS automatically classifies the data subjects, based on the comparison of the estimated examination success probability, with a pre-determined cut-off probability which is an arbitrary figure set at 0.5. Therefore, if the model calculated a probability of >0.5 the trainee would be classified as a 'pass' trainee, whereas if the model calculated a probability of <0.5 then the trainee was classified as a 'fail' trainee.

[21] The number of students correctly predicted as pass students based on random selection is calculated as (114×98)/149=75, likewise the number of students correctly predicted as failure students based on random selection is (35×51)/149=12. The overall chance classification of correctly classifying a student can therefore be computed as follows: (75+12)/149=58%. The difference between the correct classification of 75% and the chance classification of 58% is significantly different as demonstrated by the Pearson χ^2 of 23.97 (p = 0.0001).

[22] The difference between the model classification of 69% and the chance classification of 52% is significantly different as demonstrated by the Pearson χ^2 of 19.71 (p = 0.0001).

[23] Based on the null hypothesis that the student will pass.

Table 3
Classification table for fully-accredited honours graduates

Developmental sample

Cut-off point	Optimal	Optimal	Optimal	Arbitrary	Arbitrary	Arbitrary
Observed	Predicted pass first time	Predicted failed one or more	Percent correct	Predicted pass first time	Predicted failed on or more	Percent correct
	PASS	FAIL		PASS	FAIL	
Pass first time	68	30	98 (69%)	87	11	98 (89%)
Failed one or more	16	35	51 (69%)	27	24	51 (47%)
Overall	84	65	149 (69%)	114	35	149 (75%)

Holdout sample

Cut-off point	Optimal	Optimal	Optimal	Arbitrary	Arbitrary	Arbitrary
Observed	Predicted pass first time	Predicted failed one or more	Percent correct	Predicted pass first time	Predicted failed on or more	Percent correct
	PASS	FAIL		PASS	FAIL	
Pass first time	30	11	41 (73%)	35	6	41 (85%)
Failed one or more	14	19	33 (58%)	24	9	33 (27%)
Overall	44	30	74 (66%)	59	15	74 (59%)

Although the overall prediction classification of 62% and the model χ^2 of 21.375 is less than that reported by the honours model, this is still significant (p=0.0001). However, in a similar manner to the honours model, it is necessary to calculate the optimal cut-off point for the developmental group in order to obtain the most appropriate prediction classification percentage. The results are shown in Figure 2.

It is difficult from Figure 2 to identify the optimal cut-off point for the fully-accredited ordinary students as there is almost an identical path followed by both the 'pass' and 'fail' trainees from the 0.45 to 0.55 points. This suggests that there is a cluster of both types of students with probabilities in the range of 0.4 to 0.6. Nevertheless, the point at which the two lines intersect would appear to be around the 0.5 mark. The classification analysis will therefore be carried out on the arbitrary cut-off point which can also be taken as the optimum cut-off point. This will also be done for the holdout sample comprising trainees who qualified in the year 1995.

4.2. The holdout samples

The value and utility of the models can only be assessed through an evaluation of the models' ability to perform on a different data set. The models have therefore been applied to trainees who qualified in the year 1995.

4.2.1. The fully-accredited honours graduate hold-out sample

A total of 76 questionnaires were received from honours graduates who held fully-accredited degrees. However, as one of the respondents failed to disclose their ICAS examination results and another did not provide information for all the relevant variables, the holdout sample number was reduced to 74, comprising 41 trainees who had passed first time and 33 who had experienced resits.

The classification results for the holdout sample are contained in Table 3. The classifications are based on the arbitrary cut-off point of 0.5, and the optimal cut-off of 0.685.

Table 3 demonstrates that the overall prediction classification is 59%,[24] which follows a similar pattern to the developmental group, whereby 85% of actual passes are correctly classified, but only 27% of actual failures are correctly classified. Based on this arbitrary cut-off, the model does not work that efficiently, as it fails to identify those trainees who fail their ICAS examinations. Indeed, the overall prediction classification is not significantly different from that as calculated by chance. However, if the optimal cut-off point as identified from the developmental sample is used, the over-

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[24] The difference between the model classification of 59% and the chance classification of 54% is not significantly different as demonstrated by the Pearson χ^2 of 1.807, which is not significant.

Figure 2
Optimal cut-off point for fully-accredited ordinary graduates

Probability of passing all ICAS examinations
at the first attempt

——Pass ········Fail
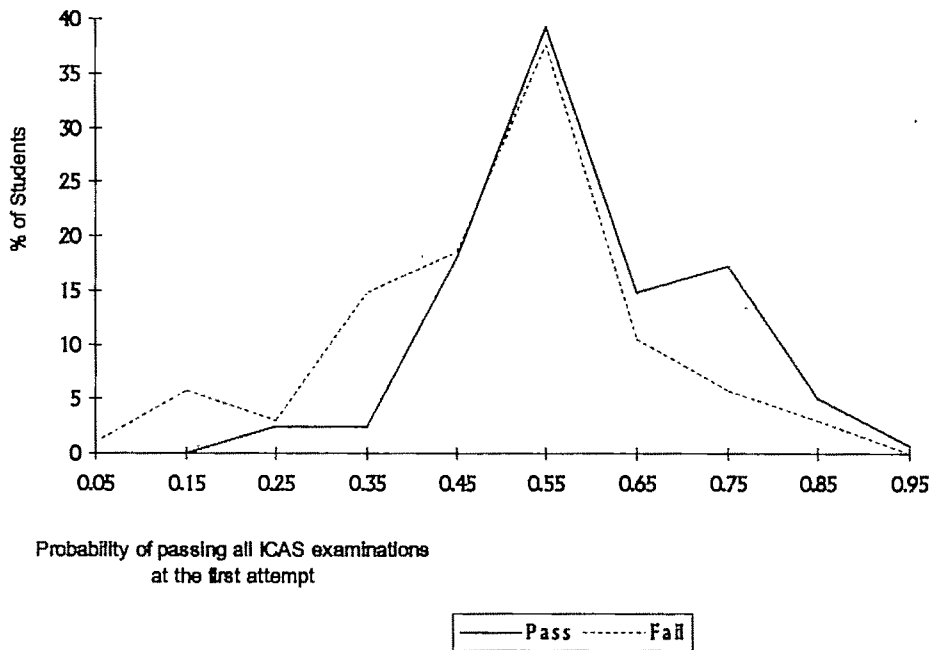
all classification increases to 66%.[25] This is a combination of 73% of actual pass trainees who are correctly classified and 58% of actual fail trainees who are correctly classified. Utilising the optimal cut-off point, derived from the developmental sample for the holdout sample, results in a more even balance of correct classifications. It also results in an overall prediction classification that is statistically different from chance.

4.2.2. The fully-accredited ordinary graduate hold-out sample

From the data collected from the 1995 trainees, 99 questionnaires were received from ordinary graduates who held fully accredited degrees. However, as two trainees did not provide information for all the variables in the model, the holdout sample numbers were reduced to 97, which

comprised 48 trainees who had passed first time, and 49 who had experienced resits.

The classification matrices for the developmental and holdout samples, based on the cut-off point of 0.5, are contained in Table 4.

The overall prediction classification of 61%,[26] as reported by the model for the development sample, represents 77% of correct classifications of actual passes with a poor 43% of correct classifications of actual failures. This is almost replicated by the holdout sample which reports an overall prediction classification of 62%,[27] whereby 79% of actual passes were predicted to pass, with a poor 45% of actual fails predicted to fail.

4.3. Evaluation of the models

In order to evaluate the model, the tetrachoric correlation coefficient (r_t) has been calculated for both the derivation and holdout samples for each model. The r_t gives a coefficient that is numerically equivalent to the Pearson r and may be regarded as an approximation to it (Guilford and Fruchter, 1978). The results can be found in Table 5.

The utility of the models can therefore be expressed by the r_t which is reported as 0.48 for the honours model and 0.42 for the ordinary model. This will provide the basis for comparison with

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[25] The difference between the model classification of 66% and the chance classification of 50% is significant as demonstrated by the Pearson χ^2 of 7.17 (p = 0.008).

[26] The difference between the model classification of 61% and the chance classification of 51% is significantly different as demonstrated by the Pearson χ^2 of 10.03 (p = 0.002).

[27] The difference between the model classification of 62% and the chance classification of 49% is significant which is demonstrated by the Pearson χ^2 of 6.352 (p = 0.012).

Table 4
Classification table for fully-accredited ordinary graduates

Cut-off point	Develop-mental	Develop-mental	Develop-mental	Hold-out	Hold-out	Hold-out
Observed	Predicted pass first time	Predicted failed one or more	Percent correct	Predicted pass first time	Predicted failed on or more	Percent correct
	PASS	FAIL		PASS	FAIL	
Pass first time	94	28	122 (77%)	38	10	48 (79%)
Failed one or more	59	44	103 (43%)	27	22	49 (45%)
Overall	153	72	225 (61%)	65	32	97 (62%)

Table 5
Model χ^2 and correlation coefficients for logistic regression models

Fully-accredited honours graduate model

Model	Model χ^2	Derivation sample r_t	Holdout sample r_t
Honours - fully-accredited graduate model based on the optimal cut-off	35.57	0.56	0.48

Fully-accredited ordinary model

Model	Model χ^2	Derivation sample r_t	Holdout sample r_t
Ordinary - fully-accredited graduate model based on the cut-off point of 0.5	21.38	0.35	0.42

Gammie (1999a) model

Model	Model χ^2	Derivation sample r_t	Holdout sample r_t
Honours graduate model	55.38	0.65	0.27
Ordinary graduate model	41.17	0.43	0.23

Harvey-Cook (1995) model

Model	Model χ^2	Derivation sample r_t	Holdout sample – point biserial correlation
Graduate trainee model	71.93		0.32

other studies and selection techniques used by the profession.

5. Comparison with other studies and selection techniques

Due to the dichotomous nature of the dependent variable, it is difficult to compare model performance with studies which utilise other modelling techniques that report validity coefficients based on the Pearson product moment correlation coefficient (r^2). The goodness of fit of a logistic regression model is examined by the model chi-square statistic. The only true comparison can therefore

be made with the Harvey-Cook (1995) and Gammie (1999a) results. These are reported in Table 5. Neither of the ICAS related models in this paper would appear to provide the level of explanatory power (based on the reported model χ^2) of the Harvey-Cook (1995) examination performance model nor the Gammie (1999a) models. The utility of the model should, however, be evaluated based on the ability of the model to correctly predict another group of students. Therefore, if it is accepted that the tetrachoric correlation can produce a coefficient which is numerically equivalent to a Pearson r and hence can be regarded as an approximation to it, an evaluation of the predictive

ability of the model on a holdout sample can be conducted and comparisons with other studies may be carried out. Table 5 reveals that the resulting tetrachoric correlation coefficients calculated for both the fully accredited honours and ordinary graduate models are superior to the Gammie (1999b) results and the Harvey-Cook (1995) results.

Both models also compare well with the results from previous meta-analytical studies. Of particular relevance are the findings of Hunter and Hunter (1984) who examined entry-level selection methods. The validity coefficients reported in this paper are superior to that reported by Hunter and Hunter (1984) for biographical inventories (0.37) and of considerable note, interviews (0.14) and academic achievement (0.11). Bearing in mind the reliance that the accountancy profession places on the interview in the selection process, the models also compare favourably with correlation coefficients from more recent meta-analytical studies examining the unstructured interview. For example, Huffcutt and Arthur (1994) reported a validity coefficient of 0.20 and McDaniel et al. (1994) a coefficient of 0.33. It must be noted, however, that both models fall short of the performance of the structured interview as reported in the meta-analytical studies of Huffcut and Arthur (1994) and McDaniel et al. (1994). Indeed, Conway et al. (1995) reported that when a structure is introduced into the interviewing process, the validity coefficient can rise to 0.67 for a highly structured interview and 0.56 for a moderately structured interview.

However, it should be. reiterated here that Harvey-Cook and Taffler (1987) found that the majority of firms did not use a structured interview approach, although this may have changed in the intervening years. The model validity coefficients as reported in this paper should therefore be compared with the validity coefficients of the unstructured interview. Even this is not a valid comparison, as it is suggested that the model should be used to filter application forms before any interviewing takes place and not as a replacement for the interview. Unfortunately, it is impossible to evaluate the validity of this pre-sift of application forms, as the studies are obviously carried out on those candidates who successfully negotiated the complete selection procedure.

The findings of the above meta-analysis are also for average coefficients based on a wide range of studies that have wide-ranging distributions. To compare the model r_t with other validity coefficients assumes that the accountancy firms will achieve the mean validities calculated, whereas in fact this may not be the case. Indeed, each individual firm may be producing either higher or lower predictive ability based on their own practice. For

the comparison to be relevant it should be drawn between each firm's own validated procedures and the ability of the model (Murphy, 1997).

6. Limitations
There is no doubt as to the importance of the fully accredited degree honours classification as a determinant of ICAS examination success. However, at the time of recruitment of trainees which tends to be October/November in the year preceding the commencement of the training contract, the vast majority of potential trainees will only be in the first term or semester of their final honours year. The honours classification will not therefore be known. Taffler et al. (1995) suggested that one possible strategy would be to use a student's expected degree class, although it is suggested here that a prediction from academic staff may be more relevant.[28]

A similar problem arises with the ordinary graduate model in respect of third year university resits. At the time of selection, any third year resits will not be known, although any previous academic weakness will have been identified during the second year. Further work is required to determine whether it would be valid to use a university tutor prediction for this particular background factor.

7. Gender issues
The Equal Opportunities Commission advocates that the intention of all those involved in carrying out selection for recruitment should be to ensure that their selection procedures are fair, unbiased and objective. The Commission suggests that shortlisting should be done systematically. Calculating probabilities from the developed models and pre-selecting on the grounds of these probabilities are the essence of a systematic method of selection. The models therefore have the advantage that they will produce a numerical score that does not depend upon opinions or subjective interpretations and would appear therefore to exclude sex bias. However, some safeguards are advisable, although not mandatory, as there are no regulatory guide-

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[28] A small scale study was undertaken at the Robert Gordon University which revealed that academic staff predictions of final year honours classifications undertaken at the beginning of the final year were correlated with the final degree classifications (as calculated by the Spearman correlation co-efficients) ranged from 0.81 to 0.84, whereas student predictions were only 0.68. High correlations between academic staff predictions and student performance in the Accounting and Finance degree at the Robert Gordon University lend weight to the fact that it is possible for academic staff to predict, with some degree of certainty, honours degree classification at the time of student recruitment. It must be noted, however, that this was a small piece of empirical work and the results obtained within one University will not necessarily replicate in another environment. Further work is needed in this area.

lines in Britain. There is no guidance in the Sex Discrimination Act 1975 and that in the Equal Opportunities Commission's code of conduct is very general. In the US, however, the US Equal Employment Opportunities Commission stipulates precise procedures by which an employer should validate the use of tests. One of these is to examine the accept and reject rates of both men and women as determined by the test and ensure compliance with the 4/5ths rule. This rule advocates that the acceptance rate of one gender must be at least the equivalent of 4/5ths of the acceptance rate of the other gender. In other words, if 100% of men were accepted on the grounds of their biodata score, at least 80% of women should also be accepted.

A gender exercise was therefore carried out on the two models. In the fully accredited honours graduate developmental group, similar percentages of men (57%) and women (56%) are accepted by the model utilising the optimal cut-off point of 0.685. There would therefore appear to be no sex bias in the model for the developmental group, although a higher percentage of women (63%) are accepted in the holdout group than that of the men (56%). The acceptance rate of the men is 89% of that of the women. This is within the parameters of the 4/5ths rule. It can therefore be concluded that there is no sex bias in the fully accredited honours graduate model. In the fully accredited ordinary graduate developmental sample, there is a marked difference in the acceptance rate of women (77%) to that of men (60%). Indeed, men have only achieved 78% of the acceptance rate of the women as opposed to the 80% required under the 4/5ths ruling. In the holdout sample there is no such problem with 68% of women and 66% of men being accepted by the model. While it is recognised that there is a borderline failure to meet the 4/5ths rule in the developmental sample, there is no apparent sex bias in the model when applied to the holdout sample. Bearing in mind that this 4/5ths rule is an American requirement and not one required in the UK, there is insufficient evidence to suggest that there is a sex bias problem in the fully-accredited ordinary model which would preclude using the model in an operational setting in the UK. It would, however, be recommended that the impact of the model on gender be constantly reviewed and monitored in the future.

8. Conclusion

This paper has demonstrated that a rational approach could result in the development of biodata models designed to predict whether a trainee passed his/her ICAS examinations at the first attempt. The models, for both fully-accredited honours graduates and fully-accredited ordinary graduates retained their predictive ability when applied to a different data set, which suggests that these models could be used in the pre-selection of trainee chartered accountants. This was also supported by comparing the predictive ability of these models, as demonstrated by the tetrachoric correlation coefficients, to the predictive ability of other types of selection procedures utilised by the training providers.

The evidence provided by these models has implications for the accounting profession that wishes to recruit trainees to undertake the ICAS system of education. The lack of significance of the UCAS point score variable within either model calls into question the common practice of training providers setting minimum number of UCAS points before they will consider an application. Firms should seek more detailed information regarding university performance on the application form and would be advised to request an indicative honours classification from the university if the award is not known at the time of application. Firms should also seek detailed information on any chartered accountancy related work experience that has been undertaken prior to application.

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Budget emphasis, participation, task difficulty and performance: the effect of diversity within culture

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Abstract – Recent research on the impact of national culture on control systems had overlooked two important aspects. First, while cross-cultural studies have saturated mainly Anglo-American and Asian nations, other important cultural regions, such as the Nordic cultural group, have largely been overlooked. More importantly, the impact of the *diversity within national culture*, brought about by the diversity of the population, in terms of ethnic background, religion, language and egalitarianism, has also not been considered. With a low power distance and moderate individualism culture, and relatively centralised and formalised industrial relations systems which emphasise democratic work environment, Norwegian managers' budgetary participation is expected to be high. More importantly, as the Norwegian culture is old and the society homogeneous in terms of ethnic background, religion and egalitarianism, the *diversity* within the Norwegian culture is likely to be much lower than those of the newer, and much more ethnically diverse, societies such as Australia and Singapore. Consequently, Norwegian managers' participation is expected to range from *medium* to *high*, rather than from *low* to high. Since *high* participation situations are common in Norway, prior studies' findings pertaining to *high* participation situations are expected to be supported in Norway. In contrast, since *low* participation situations are rare in Norway, prior studies' findings pertaining to *low* participation are unlikely to be supported in Norway. These expectations are supported by the results of this study. **Key words:** Diversity within culture, participation, performance.

1. Introduction

Prior studies suggest that superiors' evaluative styles impact significantly on subordinates' attitudes and job performance (eg. Hopwood, 1972; Otley, 1978; Brownell, 1982; Hirst, 1983; Govindarajan, 1984; Brownell and Hirst, 1986; Brownell and Dunk, 1991). This important area of research has been described by Brownell and Dunk (1991: 703) as 'the only organised critical mass of empirical research work in management accounting', and by Lindsay and Ehrenberg (1993: 223) as 'one of the relatively few areas in management accounting where there has been any sequence of repeated studies'. Recent studies have extended this area of research across national culture (eg. Frucot and Shearon, 1991; Harrison, 1992, 1993; Harrison et al., 1994; O'Connor, 1995; Lau and Tan, 1998).

However, these prior studies had overlooked a number of important aspects. First, there is a dearth of research evidence from continental

Europe in general and the Nordic region in particular, even though this region constitutes a major economic force in the global economy. Nations classified by Hofstede (1980) as having the Nordic culture include Norway, Sweden, Finland, Denmark and the Netherlands. These are some of the most industrialised and developed nations in the world with very high ranking on the social and economic indicators. However, studies relating to Norway and Sweden have focused mainly on budgetary control in the public sector rather than the private sector (eg. Jonsson, 1982; Samuelson, 1986; Hoegheim et al., 1989). Hence, research aimed at this region is needed to ascertain if the research results from other regions can be generalised to this important cultural region.

As Norway is in continental Europe, a region quite distinct from Australia and Singapore culturally and geographically, a study based on Norwegian managers may provide important evidence to ascertain if prior studies' results are generalisable across cultures and to consolidate the theory in this area of research. It will also help to address the concern of Lindsay and Ehrenberg (1993:217) on the lack of replication research in the accounting discipline. They suggest that 'being immature, the social sciences have little in the form of bodies of reliable knowledge or pedigrees of reliable methods from which to establish new

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findings. One might therefore think that replication would be treated as critical. Yet this is not the case.' Similarly, Lindsay et al. (1998) regard the current extent and frequency of replication research as clearly incommensurate with the importance of replication as the key component of the scientific method to unify disparate research findings into a solid and coherent theory. Both studies regard replication studies as crucial 'not merely to validate one's finding, but more importantly, to establish the increasing range of radically different conditions under which the findings hold, *and the predictable exceptions.*' (Linday and Ehrenberg, 1993:217) (Emphasis added.) Hence, apart from checking on the stability of prior studies' results, replication research, in the form of 'differentiated' replications, contributes to the extension of theories by the inclusion of new conditions and predicting similarities or differences in results due to the new conditions. As the Norwegian population and culture are different from those of Australia and Singapore, a study of the effects of these differences on control systems would consolidate the theories on the impact of culture on control systems.

Specifically, this study aims to ascertain if the significant three-way interaction between budget emphasis, budgetary participation and task difficulty affecting managerial performance found in the Australian (Brownell and Dunk, 1991) and the Singaporean (Lau, Low and Eggleton, 1995) environments could be generalised to the Norwegian environment. The impact of budget emphasis, participation and task difficulty on managerial performance was selected for study because their relationships constitute one of the most integrated and plausible models for resolving some of the conflicting results of prior studies in this area of research, commencing with Hopwood's study in 1972. The effects of the Norwegian culture and society on budgetary participation (and hence the three-way interaction between budget emphasis, budgetary participation and task difficulty affecting performance) are likely to be different from those found by Brownell and Dunk (1991) in Australia and those by Lau et al. (1995) in Singapore.

The first difference relates to the *extent* of budgetary participation. With respect to Australia, while the power distance score of Norway (31) is relatively similar to that of Australia (36), the individualism score of Norway (69) is considerably less than that of Australia (90) (Hofstede, 1980). Hence, whilst Australia has a very high individualism score, Norway has only a moderate level of individualism. There is a need to ascertain if such difference will result in a higher extent of budgetary participation in Norway. With respect to Singapore, since Norway and Singapore differ

considerably in both power distance and individualism (Hofstede, 1980), there is a need to ascertain if such differences would result in a difference in the extent of budgetary participation between the two cultures.

More importantly, while the effect of national culture on the extent of budgetary participation (and other variables) has been the subject of much research interest recently, the impact of *diversity within national culture* on the *dispersion* and *range* of budgetary participation has largely been overlooked. Diversity within culture (multiculturalism) is the extent to which the diversity of society such as ethnic background, religion, language, education and wealth distribution, has resulted in differences among the subcultures of subgroups within the population. Some societies, such as Norway and Japan, have populations which are much more ethnically homogeneous compared with those of heterogeneous societies such as Australia and Singapore. As differences in the ethnic diversity of population are likely to affect the extent of diversity within the national culture, the Norwegian culture is likely to be relatively homogeneous. Moreover, Norwegian industrial relations are relatively centralised and formalised, with strong emphasis on a high extent of democracy in the workplace (Johansen, 1985). In contrast, due to the ethnic diversity of their populations, the national cultures of Australia and Singapore are likely to be much more varied and cosmopolitan, comprising many different subcultures, some of which may be peculiar to only certain subgroups within the population and not shared by the rest of the population. It is likely that such differences in the extent of diversity within culture between Norway on the one hand, and Australia and Singapore on the other, may impact significantly on control systems. This means that the impact of national culture on participation is not restricted to the extent of budgetary participation (Harrison, 1992), but also on the *dispersion* and *range* of participation.

For instance, the dispersion and range of budgetary participation among the managers of a homogeneous society like Norway are likely to be small, meaning that Norwegian managers generally have relatively similar levels of budgetary participation. In contrast, the dispersion and range of budgetary participation of heterogeneous societies such as Australia and Singapore are likely to be large, meaning that the extent of budgetary participation among the managers of these societies can vary considerably. It is plausible that such differences in budgetary participation caused by the differences in the extent of diversity within culture between Norway and the other two nations, may impact on the results obtained by Brownell and Dunk (1991) in Australia and Lau et al. (1995) in Singapore.

However, to date, no studies have been undertaken to investigate the effects of this aspect of national culture.

2. Hypothesis development

Superiors' evaluative styles may influence subordinates' attitudes, behaviour and job performance. For instance, a heavy reliance on emphasis on meeting budget target as a criterion for evaluating subordinates' performance (high budget emphasis) may be associated with high job-related tension (Hopwood, 1972). However, it is likely that the impact of evaluative styles on subordinates' behaviour and job performance is contingent upon a number of moderating variables (Otley, 1978).

In particular, budgetary participation may moderate the relationship between budget emphasis and managerial performance (Brownell, 1982). Otley (1978) found that the extent to which superiors' evaluative style was associated with subordinates' job tension was conditional upon the extent of the subordinates' disagreement with the evaluative styles used to evaluate their performance. Since budgetary participation provides the channel by which superiors and their subordinates are able to communicate with each other, it may result in a better understanding of the evaluative style used. Additionally, it also provides the opportunity for subordinates to influence their budget targets. Hence, high participation not only increases subordinates' understanding of how budget targets are derived, but may also result in more realistic budget targets that subordinates are willing to accept and internalise (Becker and Green, 1962).

Note, however, that the need to understand how budget targets are derived and to influence budget targets is important to the subordinates only when budget emphasis is high because of the link between the attainment of budget targets and the reward systems. Hence, subordinates are likely to prefer high budgetary participation when budget emphasis is high. Specifically, a compatible combination of high budget emphasis and high budgetary participation is likely to be associated with higher managerial performance than other combinations of budget emphasis and budgetary participation. This therefore supports the existence of a significant two-way interaction between budget emphasis and budgetary participation affecting managerial performance (Brownell, 1982).

Task situations may further moderate the two-way interaction between budget emphasis and participation affecting performance (Hirst, 1981, 1983; Brownell and Hirst, 1986; Mia, 1987). For instance, when task difficulty is low, subordinates may be more willing to accept an evaluative style that has a high reliance on accounting performance measures because accounting performance measures are relatively complete measures of perform-

ance in such situations. Hence, a high budget emphasis evaluative style is likely to be associated with improved job performance only in *low* task difficulty situations. Since it was previously argued above that high participation is needed to complement a high budget emphasis evaluative style, a compatible combination of high budget emphasis and high participation when task difficulty is *low* is therefore likely to be associated with improved managerial performance (Brownell and Dunk, 1991).

However, in high task difficulty situations, budgetary participation has a much wider role than just facilitating subordinates' agreement and acceptance of budget targets. When task difficulty is high, subordinates' knowledge of their task completion is likely to be incomplete (Thompson, 1967; Hirst, 1981, 1983). Communication between the subordinates and their superiors is therefore crucial, as it enables subordinates to acquire from their superiors information which is vital for their task completion. Hence, regardless of the level of budget emphasis, high participation is beneficial to the subordinates' task completion and therefore associated with improved task performance when task difficulty is *high* (Brownell and Dunk, 1991).

In summary, the above discussion suggests a likely existence of a significant three-way interaction between budget emphasis, participation and task difficulty affecting managerial performance (Brownell and Dunk, 1991; Lau et al., 1995). It further suggests that a compatible combination of high budget emphasis and high participation is likely to be associated with improved managerial performance in low task difficulty situations. In contrast, in high task difficulty situations, high participation is likely to be associated with improved managerial performance, regardless of the level of budget emphasis.

2.1. Impact of national culture

While the existence of a significant three-way interaction between budget emphasis, participation and task difficulty was found in Australia and Singapore, it is unclear if these results are generalisable to other cultural regions such as the Nordic cultural group. Hence, there is a need to ascertain whether the differences in cultures between Norway on the one hand, and Singapore and Australia on the other, would influence the results. Hofstede's (1980) cultural framework, which has been tested rigorously (Hofstede, 1980, 1984; Hofstede and Bond, 1988; Hofstede, 1991) and widely used (eg. Hwang, 1989; Chow et al., 1996; Harrison, 1992, 1993; Harrison et al., 1994; O'Connor. 1995) was adopted. Hofstede (1980: 25) defines culture as the 'collective programming of the mind which distinguishes the members of one

human group from another'. The five dimensions of culture identified by Hofstede (1980) and Hofstede and Bond (1988) are power distance, individualism, uncertainty avoidance, masculinity and confucian-dynamism. Among these five dimensions of culture, there is strong theoretical support for power distance and individualism to influence the subordinates' reactions to participation in their organisations' affairs (Hofstede, 1980, 1991; Harrison, 1992; O'Connor, 1995)

Power distance and budgetary participation

In high power distance societies, hierarchies are institutionalised to formalise inequalities with power concentrated in the superior. The acceptance of centralisation of power leads to a similar acceptance of centralisation of decision-making concentrated in the hands of the superiors with little or no participation from the subordinates. Hofstede (1980: 101) states that 'in a highly stratified society where all the powers are concentrated in the hands of the superior, ... people learn to behave submissively ...(and)...do not feel that it is natural to speak up'. He further reported that in three countries with high power distance indices, 'Workers...seldom talk back to their bosses. Upward communication is neither expected nor encouraged'(115). Additionally, high power distance societies are also characterised by a lack of trust (Hofstede, 1980: 116). Since participation requires some degree of mutual trust between the negotiating parties (Pope, 1984), the low level of trust in high power distance societies may undermine the effectiveness of participation. *Hence, in high power distance societies, the extent of budgetary participation is likely to be low* (Harrison, 1992).

In contrast, *low* power distance societies de-emphasise dominance and stratification (Hofstede, 1980). Inequality is minimised with power distributed between the superior and the subordinates. Hierarchies exist for administrative convenience rather than to classify people. In such an environment, superior and subordinates regard and treat each other as equal, with equal rights, and are interdependent. People are secure and do not feel threatened by each other. Hence, there exists a high degree of interpersonal trust. These societal norms lead to a preference to participate in organisational affairs.

Hofstede (1980) maintained that in organisations, inequality in power is inevitable and functional and is usually formalised in hierarchical boss-subordinate relations with the subordinates trying to reduce the power distance between themselves and their bosses and bosses trying to maintain or enlarge it. This struggle for power between the subordinates and the bosses will continue until equilibrium is found. According to Hofstede

(1980:71), 'the strongest power distance reduction (ie., more participative conditions) tendency will not be found in the powerless (ie., subordinates in high power distance culture), but in people whose power striving is partly satisfied (ie., subordinates in low power distance culture). The power striving is not fed by dissatisfaction but by satisfaction. Having power feeds the need, making it comparable to the need for hard drugs. An individual (subordinate) can become addicted to power distance reduction.' (Parenthesis and emphasis added.) This struggle for power by the subordinates in low power distance culture is manifested in the struggle for more participation rights for the subordinates. *Hence, in low power distance societies, the extent of budgetary participation is likely to be high* (Hofstede, 1980; Harrison, 1992).

Individualism and budgetary participation

Low individualism societies are characterised by a collectivity-orientation, with emphasis on the interest of the society, group, family and clan rather than the interest of an individual. Individuals have emotional dependence on their organisations, which in turn provide security to the individuals. Accordingly, individuals are greatly concerned with the fate of their organisations because of its effect on their lives. Consequently, there is a strong desire to be involved in the decision-making process of their organisations and a belief in group decisions. *Hence, in low individualism cultures, subordinates' budgetary participation is likely to be high* (Harrison, 1992).

In contrast, when individualism is *high*, the orientation is to 'self' with emphasis on the individual rather than the group, family or organisation. Individuals do not have close relationships with their organisations and are emotionally independent of them. The emphasis is also on individual initiative and achievement, rather than group achievement. High individualism also stresses leadership and a belief in individual decisions. Superiors are more comfortable in exercising leadership, making decisions on their own and believing more in their own decisions, than in consulting their subordinates. *Hence, in high individualism societies, subordinates' budgetary participation is likely to be low* (Harrison, 1992).

2.2. The effect of Norwegian culture on the extent of budgetary participation

The impact of the Norwegian national culture on budgetary participation is different from those of the Australian and Singaporean cultures in two important aspects, namely, (i) on the *extent* of participation and (ii) on the *range* of participation among managers. With respect to the *extent* of participation, while Hofstede (1980) found Norway and Australia both have a low power distance cul-

ture, the power distance of Norway at 31 is lower than that of Australia at 36. With individualism, while individualism for Norway is at a moderate level of 69, the individualism score of Australia is high at 90 (Hofstede, 1980). Hence, while the relatively low power distance of both Norway (31) and Australia (36) promote high budgetary participation, the extent of participation in Australia is reduced by its high individualism (90) which discourages participation. In contrast, the high participation in Norway promoted by its low power distance is not reduced to the same extent as in Australia because of Norway's much lower individualism (69). This means that the extent of Norwegian managers' participation is likely to be higher or at least as high as those of Australian and Singaporean managers.

2.3. The effect of Norwegian culture on the range of budgetary participation

The second important impact of the Norwegian national culture on budgetary participation is on the *range* of budgetary participation among Norwegian managers. Compared with those of Australia and Singapore, diversity within the Norwegian culture is low. This may be due to a combination of historical, geographical, political and economic factors of these three nations.

Australia has a population of about 18m. The most striking feature of this population is its diversity in terms of the number of ethnic groups, which make up this population and the number of immigrants who have settled in Australia since World War II. Until then, the Australian culture and population reflected the basic tenets of their British origins. However, significant social and demographic changes occurred after World War Two. The ethnicity of Australian culture was revolutionised by the arrival of large number of immigrants from eastern and southern Europe. More recent events, such the abandonment of the White Australia Policy, the turmoils in Vietnam, Middle East and South Africa have led to an influx of immigrants from Asia, the Middle East and Africa. It is therefore not surprising that approximately 25% of the population was born outside Australia from a diverse number of countries. These new immigrants not only introduce new customs, but also modify their cultures to adapt to their new adopted country. In terms of religion, even though the population is largely Protestant, Australia has no established church. Approximately 25% of the population is Roman Catholic. In addition, consistent with the diversity in the ethnic background of the population, there are smaller Orthodox, Muslim and Jewish groups. Finally, Australia's proximity to Asia and the country's emphasis on an open economy and international trade have all contributed to expose its population and its culture

to the influence of other cultures and rapid global changes. These have brought about a unique Australian culture which is extremely rich in terms of diversity and variations.

With Singapore, the cosmopolitan nature of its society is attributed to its history and location. Historically, Singapore was ruled by Indonesia (Sri Vijaya) up until the 14th century and subsequently by Malaya (Malacca) and European nations such as Portugal, the Netherlands and Great Britain. Located in a region dominated by Indonesian/Malay Muslim culture, Singapore has retained its Malay heritage. It is also at the crossroads of the two important Indian and Chinese ancient civilisations. Hence, the Singaporean culture has strong tenets of Malay, Muslim, Chinese, Indian and European influence. Its native Malay population was overshadowed by the influx of large numbers of Chinese and Indian immigrants during the British colonial period. Consequently, its current population of over 3m people is extremely ethnically diverse. Even though the population is mainly Chinese (78%), there are two sizeable minority groups of Malay (14%) and Indians (7%). The country has four official languages, namely, English, Mandarin Chinese, Malay and Tamil. There are a number of principal religions including Buddhism, Islam, Hinduism, Confucianism and Christianity. Moreover, as a former colony of Great Britain, there is also a strong Anglo and Western influence, resulting in a population which is predominantly Asians, but with a progressive and Western outlook, including the widespread use of the English language and a favourable bias towards international trade. A large number of Singaporean managers are also educated overseas, particular in Western countries, and are thus exposed to the cultures of these places. The emphasis on international trade also ensures that Singaporean managers are continuously exposed to the diversity of the cultures of other nations. These factors have contributed to a diverse and cosmopolitan Singaporean culture.

The above discussion suggests that, while a distinctive Australian culture and a distinctive Singaporean culture are discernible, these national cultures are diverse rather than homogeneous as they are influenced by many subcultures. In contrast, the Norwegian culture is much older and more stable. According to archaeological evidence, people with a Palaeolithic culture inhabited Norway as early as 14,000 years ago. Today, the Norwegian population is homogeneous, comprising predominantly people who are primarily Germanic and descendants of early colonies of settlers who migrated to Norway from Denmark and Sweden. Norway is extremely mountainous and only about 3% of its land is arable. Historically, this isolation and lack of arable land have con-

tributed to the low level of immigration of other races into Norway. Instead, Norwegians relied heavily on the sea to communicate with other parts of Europe and were famous for their expeditions as traders, colonisers, explorers and plunderers. Within Norway itself, however, the population has remained ethnically homogeneous, with no significant minority groups. In 1997, out of a total Norwegian population of 4,413,800, the largest ethnic minority are the 20,000 odd Lapps, followed by a few thousand people of Finnish origin. An overwhelming majority of the population is primarily Germanic. Norwegians are also homogeneous in terms of religion. An overwhelming majority is Christian, with more than 90% of the population belonging to the Evangelical Lutheran Church. Norway has two official languages (Bokmal and Nynorsk), which have equal validity in law. Both are taught in schools and are familiar to all Norwegians. These generally homogenous characteristics, together with the lack of immigration, have resulted in a Norwegian culture which is much more homogenous compared with those of newer, heterogeneous societies such as Australia and Singapore. This difference in the *diversity within the national culture* is likely to have major effects on management control systems. As the Norwegian culture is relatively homogenous, variations in social, economic and business practices, including the extent of budgetary participation, within the Norwegian society, are likely to be smaller than those of Australia and Singapore.

2.4. Other Norwegian cultural effects on the extent and the range of budgetary participation

The Norwegian culture has promoted a strong trade union movement and a political system dominated by strong left-wing governments. The link between culture and the trade union movement was supported by Hofstede's (1980:104) findings which indicated a relationship between culture and 'the kind of labour movement a country has'. Similarly, his findings also support a link between culture and the political systems. They indicated that political systems and ideological thinking in various countries show differences, which were interpreted as *consequences* of cultural differences.

The Norwegian trade union movement (Landsorganisionen), which can be traced back to the 1840s, shares a strong consolidated position with the Norwegian Labour Party (DNA), the party in government in Norway since 1935 except for a few short breaks. Jointly and with the support of the employers group (Confederation of Employers or NAF), they have pushed for industrial democracy. Hence, Norwegian industrial relations history had been characterised by deliberate attempts by both the labour union movement and successive Norwegian governments to democratise the work

environment to protect Norwegian employees' rights and welfare and to ensure the fair distribution of wealth. In a study of Norwegian industrial relations systems, Johansen (1985:3) noted that from the early 1960s, the Norwegian government has been involved 'in the first systematic national effort in the world to change and *democratise the quality of work life* ...(which) ...in turn strengthened trade union participation in technological change and *more humanistic and democratic forms of work....* Norway and Sweden have become leaders in developing innovative and democratic approaches to the problems of automation and work design'. (emphasis added.) Consequently, in place of the orthodox capitalistic view of profit maximisation, Norwegian culture emphasises a *democratised* work environment whereby employees enjoy a high level of participation in all aspects of their organisations' affairs including employees' representation at their companies' boards, 'Company Assemblies', and work environment committees (Work Environment Act). *Such participative structures in the Norwegian industrial relations system are a reflection of the Norwegian culture and its preference for participation.* The industrial relations system, as one of the most important societal institutions, is about employee-employer relationships and hence, is people-oriented. It cannot evolve independently and differently from the people and their culture and its characteristics cannot be contrary to the norms and values of the people who constitute the three key players that design it, namely the employees, the employers and the governments.

In explaining the existence of participative structures in the industrial relations systems of 12 European countries, the IDE International Research Group (1981:6) concluded that there was 'a *cultural* explanation... where we may argue that participative structure (in the industrial relations system) *is determined by the value-system*'. (emphasis and parenthesis added.) They further concluded that 'it will be clear that *the cultural explanation...covers* not only the participative structure proneness of the unions, but... *that of the government and even the employers group as well.*' (264) (italics added.) In his discussion of industrial democracy, Hofstede (1980:268) similarly suggested that 'the term industrial democracy... includes concepts like participative management, joint consultation...worker directors, worker self-management, shop floor consultation.... *The feasibility of various forms of industry democracy relates to the value system of the organisation members.*' (emphasis added.) Hence, the industrial relations system must be a consequence and a reflection of the population and its culture, and indeed, is part of the national culture.

In addition to unions and employer groups, the

role of governments is also important in shaping industrial relations systems. In the long run, industrial relations systems will not survive unless they are supported by governments. Backed by a strong Norwegian labour movement and a relatively homogeneous population, successive Labour Party-dominated governments in Norway were able to introduce legislation to formalise workplace democracy. As governments and indeed whole political systems are themselves a consequence of the national culture, such moves and legislation by the Norwegian governments would not have been possible if they are not in accord with the value system of the population. Hofstede (1980:134) suggested that 'political systems cannot survive for long if they were not in harmony with the mental programming of the citizens.... Laws and bylaws are the form par excellence in which societal norms are expressed. We find *legislation* as one of the consequences of societal norms...it serves...the norms.... Attempts to codify labour-management relations in Britain (the Industrial Relations Act) failed because they are too much against societal norms'.

In conclusion, characteristics of democracy and its formalisation in the Norwegian industrial relations are a reflection of the Norwegian culture. Its norms and values permeate and shape all spheres of Norwegian society, including its political systems, legislation and industrial relations systems. Hofstede (1980:22) summed up as follows:

> 'There must be mechanisms in societies, which permit the maintenance of stability in culture patterns across many generations. In the centre is a system of societal norms, consisting of the value systems.... Their origins are in a variety of ecological factors.... The societal norms have led to the development and pattern maintenance of institutions in society with a particular structure and way of functioning. These include the family, education systems, politics and legislation.... Institutions may change, but this does not necessarily affect the societal norms; and when these remain unchanged, the persistent influence of a majority value system patiently smooths the new institutions *until their structure and functioning are again adapted to the societal norm'*. (emphasis added.)

Hence, for the Scandinavian region in general, and Norway in particular, the national culture has led to a work environment in which participation by employees in organisational decisions is regarded as culturally acceptable and crucial to improve work environment for the benefits of all parties (Johansen, 1985). This means that participation in organisational affairs, including budgetary participation, is likely to be not only high, but also common and widespread among Norwegian managers.

Overall, based on the above discussion, it is possible to conclude that: (i) the Norwegian culture is different from those of Australia and Singapore; (ii) Norwegian managers' budgetary participation is likely to be high and at least as high as those of the Australian and Singaporean managers; and (iii) the range of Norwegian managers' budgetary participation is smaller than those of Australian and Singaporean managers. The following hypotheses are therefore tested:

H1 Norway's power distance is low and individualism is moderate.

H2 Norwegian managers' budgetary participation range is smaller than those of Australian and Singaporean managers, ranging from *medium* to high, rather than from *low* to high.

The above hypotheses suggest that the Norwegian culture is likely to affect the significant results of the three-way interaction between budget emphasis, participation and task difficulty affecting managerial performance found in Australia and Singapore, mainly through its effect on participation. Norwegian culture and society support the existence of medium and high participation but not low participation. *This means that Brownell and Dunk's theory pertaining to high participation will be generalisable to Norway because high participation situations are common in Norway, whereas their theory pertaining to low participation will not be generalisable to Norway because low participation situations are rare in Norway.* These are examined further below.

Situations involving high participation (Situations 1, 2, 5 and 6; Table 1)

Table 1 presents the expected performance for the eight possible combinations of the three-way interaction between budget emphasis, participation and task difficulty affecting managerial performance. With respect to those situations involving *high* participation (see column (d) for Situations 1, 2, 5 and 6; Table 1), Brownell and Dunk hypothesised as follows (see column (e), Table 1). In low task difficulty situations, they argued that a compatible combination of high budget emphasis and *high* participation (Situation 1) is superior to a mismatched combination of low budget emphasis and *high* participation (Situation 2). In high task difficulty situations, they argued that *high* participation (Situations 5 and 6) is associated with improved performance, regardless of budget emphasis. As all these combinations (Situations 1, 2 5 and 6) involve *high* participation (see column (d)), and as high participation situations are common in Norway, these expectations are expected to be supported by the results of this study in Norway.

Table 1
Participation and managerial performance for combinations of budget emphasis, participation and task difficulty

Situations (a)	Task difficulty (b)	Budget emphasis (c)	Participation (d)	Expected performance according to Brownell and Dunk (e)	Expected participation in Norway (f)	Expected performance in Norway (g)
1	Low	High	High	High	High	High
2	Low	Low	High	Low	High	Low
3	Low	High	Low	Low	Moderate	Moderate/Unclear
4	Low	Low	Low	High	Moderate	Moderate/Unclear
5	High	High	High	High	High	High
6	High	Low	High	High	High	High
7	High	High	Low	Low	Moderate	Moderate
8	High	Low	Low	Low ·	Moderate	Moderate

Situations involving low participation (Situations 3, 4, 7 and 8; Table 1)

With respect to those situations involving *low* participation (see column (d) for Situations 3, 4, 7 and 8; Table 1), Brownell and Dunk hypothesised as follows (see column (e)). In low task difficulty situations, they argued that a compatible combination of low budget emphasis and *low* participation (Situation 4) is superior to a mismatched combination of high budget emphasis and *low* participation (Situations 3). In high task difficulty situations, they argued that *low* participation (Situations 7 and 8) is associated with poor performance (column (e)), regardless of budget emphasis. As all these situations (Situations 3, 4, 7 and 8) involve *low* participation, and as *low* participation is rare in Norway because participation is expected to range from medium to high, these hypotheses of Brownell and Dunk may not be supported in Norway. For instance, in high task difficulty situations, while a significant difference in performance is expected in theory between a *high* participation situation (e.g. Situation 5) and a *low* participation situation (e.g. Situation 7), it is unclear if a significant difference in performance could be detected between *high* participation and *moderate* participation in Norway. Note that, like Australia and Singapore, participation is expected to exert a positive effect on performance in Norway. However, it is unclear if this positive effect will be strong enough to be significant since the range of participation in Norway is likely to be small, ranging only from medium to high.

Based on the above discussion, the following hypotheses are tested (see column (g) of Table 1):

H3 There is a significant three-way interaction between budget emphasis, budgetary participation and task difficulty affecting Norwegian

managers' performance.

H4 In *low* task difficulty situations, a compatible combination of high budget emphasis and high participation (Situation 1) is associated with higher managerial performance than an incompatible combination of low budget emphasis and high participation (Situation 2).

H5 In *high* task difficulty situations, Norwegian managers' performance is not significantly different between low and high budgetary participation (Situation 5 versus 7 or Situations 6 versus 8).

3. Method

Data were collected by the use of a questionnaire in Norway. Norway was selected for study because it was reported by Hofstede (1980, 1984) and Hofstede and Bond (1988) to have a low power distance-*moderate* individualism culture. This therefore places Norway in a cultural group which is different from the low power distance-*high* individualism Anglo-American group (e.g. UK, USA, Australia) and the *high* power distance-low individualism South East Asian group (eg. Singapore, Malaysia) (Hofstede, 1980). Hence, a comparison between Norway, Singapore and Australia may indicate whether the underlying theories of many prior studies, which had compared mainly Anglo-American culture with Asian culture, are sound and generalisable.

As the research instruments selected for this study were all developed using the English language, and as English is not widely used in Norway, the instrument was translated from English to Norwegian. The translation process involved the following steps. The English version of the questionnaire was first translated by one of the

researchers who is a Norwegian national and hence is highly proficient in Norwegian. The Norwegian version of the questionnaire was then translated back to English by a Norwegian language expert who had extensive translation experience in Norwegian consulates overseas. This translated English version was then compared with the original English version of the questionnaire by the researcher to ensure that the translation was correct. This was then further checked by a group of Norwegian students before they were used in this study.

Since an important objective of this study was to compare the national cultures of the three countries, the sample selected must be reasonably representative of the population of managers. A randomly selected sample would be important. Brownell and Dunk's (1991) were similarly concerned with the samples of prior studies which did not rely on random sampling. Consequently, they took great care to ensure that their sample was as close to a randomly selected sample as was practical. As noted by them that 'while random sampling in the pure sense is an impractical ideal, by sampling from a total of 46 organisations, we believe that we have effectively addressed the threat described here'. Lau et al. (1995) adopted a similar sampling method by selecting a random sample of 80 Singaporean companies. In this study, we have adopted a similar sampling method as the other two studies by selecting a random sample of Norwegian companies.

Fifty mining companies were selected randomly from the Norwegian oil and gas industry. The selected organisations were contacted by telephone to obtain the names of three different functional heads so that the questionnaire could be mailed directly to the intended respondents. Three different functional heads were selected from each organisation to ensure independence of observations. Only the Norwegian version of the questionnaire, together with a covering letter assuring the respondent confidentiality of the information provided and a prepaid self-addressed reply envelope were mailed to each of the 150 respondents. A follow-up telephone call was made to each of those respondents who had not replied four weeks after the questionnaire was sent.

A total of 75 questionnaires were returned. Four responses were not useable, as the questionnaires were not fully completed. This leaves the study with 71 useable responses, yielding a response rate of 47.3%. Non-response bias tests suggested by Oppenheim (1992) indicated that there were no significant differences in the responses of the early and late respondents.

Demographic data indicate that the respondents' mean age was 54.6. They had a mean of 9.7 years of experience; had been in their current positions for a mean of 4.5 years and had a mean of 162 employees in their areas of responsibility. These results suggested that these respondents were highly experienced and held very senior positions in their organisations.

3.1. Measurement instruments

Budget emphasis. This was measured by Hopwood's (1972) instrument. This instrument was adopted for this study as it is one of the most widely used instruments to measure evaluative styles of superiors (e.g., Otley, 1978; Brownell, 1982, 1985; Brownell and Hirst, 1986; Harrison, 1992). For this study, the rating rather than the ranking approach was used. The scores of budget emphasis were derived by summing the scores of the two key measures of 'Meeting the budget' and 'My concern with costs'. There were a number of reasons for the choice of these approaches.

The rating approach was adopted because Brownell (1985) reported problems with the ranking approach. He reported that many respondents failed to complete properly the ranking called for by the measure. The rating approach was considered appropriate as Hopwood (1972) had reported evidence of consistency between the rankings and the ratings.

The summation approach was adopted for this study to measure the extent to which accounting measures were relied upon by superiors to evaluate their subordinates. The two measures of 'Meeting the budget' and 'My concern with costs', were both accounting measures. These two measures were also the key measures used by Hopwood (1972) to ascertain if the evaluative styles were accounting style or non-accounting style. According to Hopwood (1972:165), if 'neither meeting the budget nor concern with costs ranked among the top three criteria', the evaluative styles is categorised as 'non-accounting style'. This approach was also supported by a number of prior studies (eg. Brownell, 1985; Brownell, 1987; Dunk, 1989a, 1989b; Brownell and Dunk, 1991; Harrison, 1992, 1993 and Lau et al., 1995)

Both Brownell and Dunk (1991) and Lau et al. (1995) had used Hopwood's (1972) instrument and the rating and the summation approaches to measure budget emphasis. Adopting the same instrument and the rating and summation approaches therefore also has the added advantage of being consistent with these two earlier studies, the results of which were used for comparison with those from this study. Both Brownell (1985) and Otley and Fakiolas (2000) suggested that the summation method is legitimate provided there is a high correlation between the two key accounting items. For this study, the correlation between these two items was 0.417 (p<0.01).

Budgetary participation. Consistent with

Brownell and Dunk and Lau et al., who both used the Milani (1975) six-item, seven-point additive instrument to measure participation, this same instrument was employed in this study. The Cronbach alpha of this instrument for this study was 0.75. A factor analysis indicated that the items were unidimensional with all six items loading satisfactorily on a single factor (Engenvalue of 3.26 and an explained total variance of 54.4%).

Task difficulty. In order to facilitate the comparison of the results of this study with those of studies undertaken in Australia and Singapore, it would be preferable if the same instruments that were used by by Brownell and Dunk (1991) and Lau et al. (1995) were also used for this study. However, an exception was made for the task difficulty instrument. Both Brownell and Dunk and Lau et al. used the Van de Ven and Delbecq (1974) instrument to measure task difficulty. For this study, however, the Daft and Macintosh (1981) instrument, which comprises an additive five-item and five-point scale, was chosen instead.

The justification for the change in instrument is as follows. First, the Van de Ven and Delbecq instrument used by Brownell and Dunk and Lau et al. has a history of poor internal reliability statistics. Mia (1987) achieved a Cronbach alpha value of only 0.55. A similar low value of 0.57 was obtained by Brownell and Dunk. Lau et al. had an even lower value of only 0.41. Given these relatively low alpha values, the continued use of this instrument may be problematic.

It is also not always necessary to retain the same measurement instruments in replication research. Lindsay and Ehrenberg (1993) distinguished between close replication and differentiated replication. They described close replication as the retention of all the known conditions of the original study in the replication, whereas differentiated replication involves deliberate variations in fairly major aspects of the conditions of the original study. They considered close replication as particularly suitable early in a program of research, but considered differentiated replication as more useful subsequently. They also consider differentiated replication as crucial because 'exploring a result with deliberate variations in the conditions of observation is the essence of generalisation' (221). Hence, as the Van the Ven and Delbecq task difficulty instrument had already been tested twice in Brownell and Dunk (1991) and Lau et al. (1995), with results that were generally in accordance with expectations, the use of a different task difficulty instrument, namely, the Daft and Macintosh instrument, may have the advantage of achieving what Lindsay and Ehrenberg (1993:221) considered as 'convergent validity or triangulation', which enhances confidence in results. It would

also enable us to ascertain the robustness of the theory. If our results are in accordance with our expectation, they would not only demonstrate that the theory holds for different measurement instruments, but that it had held in the two prior studies (Brownell and Dunk and Lau et al.) despite the weaknesses of the task difficulty instruments used in those studies.

We included only the Daft and Macintosh instrument and not both the Van de Ven and Delbecq instrument and the Daft and Macintosh instrument in our questionnaire. As both instruments were relatively lengthy, and given our intention to use the Daft and Macintoch measure in our study, the omission of the Van de Van and Delbecq instrument from the questionnaire assisted in reducing the length of the questionnaire to a reasonable level.

The Cronbach alpha score obtained in this study was 0.77, which was much higher than those obtained by Brownell and Dunk and Lau et al. with the Van de Ven and Delbecq instrument. A factor analysis also supported the unidimensional nature of the items with all items loading satisfactorily on a single factor (Engenvalue of 2.65 and an explained total variance of 53%). An elaboration on the choice of the Daft and Macintosh instrument is included in the discussion section of the paper

Managerial performance. Both Brownell and Dunk and Lau et al. measured this variable with the nine-dimensional seven-point Mahoney et al. (1963, 1965) instrument. Both studies also used only the scores of the item relating to the overall effectiveness of the respondents for their data analysis. This same instrument and approaches used by these two earlier studies were employed for this study in Norway. A regression of the scores of the overall effectiveness item with the scores of the other eight items produced a coefficient of determination of 52.4%, which is very close to the 0.55 specified by Mahoney et al. for their instrument.

Power distance and individualism. These were both measured by the instruments developed by Hofstede (1980). Since these instruments were used by a number of prior cross-cultural studies (e.g. Hwang, 1989; Chow et al., 1996; Harrison, 1992, 1993; Harrison et al. 1994; O'Connor, 1995), the use of these instruments in this study would facilitate comparison of results with those of these prior studies. The power distance instrument comprises three questions, while the individualism instrument is a six-item instrument.

Table 2 presents the descriptive statistics of the independent and the dependent variables, while Table 3 shows the correlation coefficients of the variables based on the Pearson pairwise correlations.

Table 2
Descriptive statistics of independent and dependent variables (n=71)

Variables	Mean	Std dev	Theoretical range		Actual range		Cronb alpha
			Min	Max	Min	Max	
Budget emphasis	11.27	1.87	2	14	7	14	na
Participation	32.62	6.02	6	42	13	41	0.75
Task difficulty	13.97	3.59	5	25	8	23	0.77
Performance	5.59	0.86	1	7	3	7	na

Table 3
Correlation matrix among independent and dependent variables

	Budget emphasis	Budgetary participation	Task difficulty
Participation	0.413**		
Task difficulty	–0.177	–0.010	
Managerial performance	0.285*	0.107	0.087

** p <0.01
* p <0.05

Table 4
Power distance and individualism indices

	Power Distance	Individualism
Hofstede and Bond (1988)		
Norway	31	69
Australia	36	90
Singapore	74	20
Present study		
Norway	–10	69

4. Results

4.1. Hypothesis H1

Hypothesis H1 states that Norway has a low power distance and moderate individualism culture. The results in Table 4 indicate that the power distance score for Norway is low at –10. Based on Hofstede's (1980) formula, power distance scores can range from –90 to 210. Hence, the power distance score of –10 found in this study for Norway is within the theoretical range. This is very much below the 74 reported for Singapore by Hofstede and Bond (1988). Even with Australia, the –10 score for Norway reflects a substantial difference of 46 when compared with the 36 reported for Australia by Hofstede and Bond (1988). With re-spect to the individualism, a score of 69 was found for Norway in this study. This score was in accordance with expectation, and is in fact identical to the one reported by Hofstede and Bond (1988). These results provide support for H1.

4.2. Hypothesis H2

Hypothesis H2 states that Norwegian managers' participation range is small, ranging from medium to high, instead of low to high. Table 5 indicates that for the Norwegian managers, the mean participation score is 32.62. Compared with the theoretical mean of 24, the actual mean of 32.62 supports the expectation that participation among Norwegian managers is high. Brownell and Dunk (1991: 697)

Table 5
Descriptive statistics of participation scores with Milani's instrument

Studies	Mean	Std dev	Min	Max	Range
Norway (Present study)	32.62	6.02	13	41	28
Australia (Brownell & Dunk)	31.21	7.49	6	42	36
Singapore (Lau et al.)	30.65	7.63	6	42	36

Table 6
Results of regression of managerial performance on budget emphasis, participation and task difficulty (n =71)

Variable	Coeff	Est	t-value	p
Constant	b_0	37.542	2.170	0.017
Budget emphasis (B)	b_1	−2.739	−1.733	0.044
Participation(P)	b_2	−1.167	−2.118	0.019
Task difficulty(T)	b_3	−2.010	−1.663	0.051
BxP	b_4	0.097	1.979	0.026
BxT	b_5	0.169	1.520	0.067
PxT	b_6	0.070	1.839	0.035
BxPxT	b_7	−0.005	−1.677	0.049
R^2			0.180	
F value			1.975	
p <			0.036	

reported a lower 31.21 mean participation score for Australian managers, whilst Lau et al. (1995: 368) reported an even lower mean participation score of 30.65 for Singaporean managers. These results indicate that Norwegian managers' mean participation score are high and higher than those of Australian and Singaporean managers.

Table 5 also indicates that the Norwegian managers' minimum actual participation score is 13, which is considerably higher than the theoretical minimum of 6. It is also higher than those reported by Brownell and Dunk for Australia (6) and Lau et al. for Singapore (6). Following these results, the range of participation among Norwegian managers of 28 is the smallest compared with the 36 for both the Australian and Singaporean managers. These results support the expectation that Norwegian managers have a smaller range of participation than Australian and Singaporean managers. Table 5 also indicates the standard deviation of 6.02 found in this study for the Norwegian participation score is the lowest among the three nations (7.49 for Australia and 7.63 for Singapore). As the results in Table 5 indicate that Norwegian managers' participation is high and its range is small, it is possible to conclude that Norwegian

managers' participation ranges from medium to high, rather than from low to high. Hence, hypothesis H2 is supported. Further discussion and additional support (see Table 9) for this hypothesis are presented later.

4.3. Hypotheses H3, H4 and H5
The following regression model was used to analyse the data for hypothesis H3:

$$Y_i = b_0 + b_1B_i + b_2P_i + b_3T_i + b_4B_iP_i + \quad (1)$$
$$b_5B_iT_i + b_6P_iT_i + b_7B_iP_i T_i + e_i$$

where Y_i = Managerial performance; B_i = Budget emphasis: P_i = Budgetary participation; T_i = Task uncertainty; and e_i = Error term.

Table 6 presents the results for the three-way interaction model. The results indicate that coefficient b_7 of the three-way interaction between budget emphasis, budgetary participation and task difficulty affecting managerial performance is significant (est=−0.005; p≤0.049). The coefficient of determination is 18%. These results are consistent with those of Brownell and Dunk and Lau et al. who also found the three-way interaction to be significant. Hypothesis H3 which states that there is a significant three-way interaction between

budget emphasis, budgetary participation and task difficulty affecting managerial performance in Norway, is supported.

To ascertain the nature of the three-way interaction, the sample was dichotomised into low and high task difficulty subsamples at its mean. The following regression models were used to analyse the data for the low and high task difficulty subsamples.

$$Y_i = b_0 + b_1B_i + b_2P_i + e_i \qquad (2)$$

$$Y_i = b_0 + b_1B_i + b_2P_i + b_3\,B_i\,P_i + e_i \qquad (3)$$

Equations 2 and 3 were used to ascertain the main effects and the two-way interaction effects, respectively.

Low task difficulty situations

The results presented in Table 7 indicate that, for the *low* task difficulty subsample, coefficient b_3 of the two-way interaction between budget emphasis and participation affecting performance is significant (est = 0.034; p<0.016 in Equation 3). The R^2 of the main effect model (equation 2) increases by 11.2% from 0.182 to 0.294. These results provide support for hypothesis H4, which states that in *low* task difficulty situations, a compatible combination of high budget emphasis and high participation is associated with higher managerial performance than an incompatible combination of low budget emphasis and high participation. They are also similar to those of both Brownell and Dunk (1991) and Lau et al. (1995) who also found significant two-way interactions between budget emphasis and participation in low task difficulty situations.

The results in Table 7 further indicate that coefficient b_1 for budget emphasis in Equation 2 is highly significant (est=0.295, p<0.005; Equation 2). Overall, these results indicate that, in Norway, budget emphasis is a crucial variable affecting managerial performance as it not only significantly influences managerial performance on its own, but also interacts with budgetary participation to affect performance. These results are consistent with those found in Singapore by Lau et al. (1995: 372) who found not only a significant two-way interaction between budget emphasis and participation affecting performance, but that budget emphasis also exerted a highly significant positive main effect on performance.

High task difficulty situations

For the high task difficulty situations, the results in Table 7 indicate that coefficient b_3 of the two-way interaction between budget emphasis and participation affecting performance is, as expected, not significant (est = 0.003, p<0.415). The R^2 of the main effect model (Equation 2) is barely affected by the introduction of the two-way interaction term in Equation 3. These results indicate that budget emphasis does not interact with participation to affect performance in Norway. Similar results were found by Brownell and Dunk in Australia and Lau et al. in Singapore.

More importantly, for the main effect model (Equation 2), Table 7 indicates that coefficient b_2 for budgetary participation, whilst positive, is not significant (est =0.025, p<0.198). These results suggest that budgetary participation does not exert a significant positive main effect on performance. These results are different from those of Brownell and Dunk and by Lau et al. who both found a significant positive main effect for budgetary participation in high task difficulty situations. However, they are in accordance with hypothesis H5, which states that in high task difficulty situations, budgetary participation is *not* associated with managerial performance in Norway. Recall that these differences in results were attributed to the effects of the low diversity within the Norwegian culture which caused only a small variation in the extent of budgetary participation among the Norwegian managers so that the beneficial effects of the slightly higher extent of budgetary participation for some Norwegian managers is not readily detectable in high task difficulty situations. This does not mean that participation is not important for Norwegian managers in high task difficulty situation. Indeed, the results in Table 7 indicate that the main effect of participation on performance is *positive* (est =0.025; Equation 2) and the p-value is 0.198. However, because the range of Norwegian managers' participation is low, ranging only from medium to high (instead of low to high), the increase in managerial performance arising from participation did not reach a significant level in Norway.

Table 7 further indicates that budget emphasis in Equation 2 has no significant main effect on performance in high task difficulty situations (est = 0.078, p<0.179). This result is consistent with those found in Australia by Brownell and Dunk and in Singapore by Lau et al.

Further analysis of the three-way interaction

As the two-way interaction between budget emphasis and participation affecting performance is significant for the *low task difficulty subsample* (see Table 7, Equation 3), both budget emphasis and budgetary participation were dichotomised at their respective means for the *low task difficulty subsample* to assist in the interpretation of the results. The results for the low task difficulty subsample are presented in Table 8.

Table 8

Cell frequencies, means and standard deviations for managerial performance across low and high
budget emphasis and participation (low task difficulty subsample; n= 36)

			Budget emphasis			
Participation		Low			High	
Low	$\bar{y}$	=	5.3	$\bar{y}$	=	5.5
	sd	=	0.67	sd	=	1.22
	n	=	10	n	=	6
High	$\bar{y}$	=	4.4	$\bar{y}$	=	5.7
	sd	=	1.34	sd	=	0.88
	n	=	5	n	=	15

Low task difficulty situations

For the low task difficulty situations, Table 8 indicates that the mean managerial performance is highest in the high budget emphasis-high participation cell (5.7). In contrast, the mean managerial performance for the low budget emphasis-high participation combination is considerably lower at 4.4 (lowest). These results are consistent with hypothesis H4 which states that managerial performance for the matched combination of high budget emphasis-high participation is higher than that of the mismatched combination of low budget emphasis-high participation combination. They are also in accordance with the theory that the results of Brownell and Dunk in Australia and Lau et al in Singapore, respectively, will hold in Norway because, like Australia and Singapore, high participation exists in Norway.

Brownell and Dunk (1991) also found the *low* budget emphasis-*low* participation combination to be associated with improved performance in Australia. This result was not expected to hold in Norway because the Norwegian culture promotes high participation and a small range of participation and hence, low participation situations may not exist in Norway. Table 9 presents the results of the participation and performance scores for the eight possible combinations arising from the three-way interaction between budget emphasis, participation and task difficulty. For the *high* participation situations (Situations 1, 2, 5 and 6) the actual mean participation scores are 37.2, 35.6, 36.6 and 36. These are well above the theoretical mean of 24 for participation. For the *low* participation situations (Situations 3, 4, 7 and 8), the mean participation scores are 29.7, 25.2, 29.0 and 26.1. Note that none of these participation situations, classified as 'low' participation, are really 'low' participation situations because their mean participation values are all above the theoretical mean of 24 for

participation. For two of these situations, namely, Situations 3 and 7, even the reported *minimum* participation scores of 27 and 28, respectively, are well above the theoretical mean of 24. Consequently, they should be classified as 'medium' participation. These results provide further support for hypothesis H2 which states that Norwegian managers' budgetary participation ranges from *medium* to high, rather than from *low* to high. This means that the high performance associated with the low budget emphasis-low participation combination found in Brownell and Dunk (1991:700) was not expected to be found in Norway because low participation situations are rare in Norway. The results in Table 9 support this expectation as the mean performance score of 5.3 for this particular combination (Situation 4) is the second lowest in the low task difficulty situations.

Note that as the Norwegian culture promotes at least a moderate level of participation, the high budget emphasis-low participation combination (Situation 3, Table 9) in Norway is not as incompatible as it seems. Since participation is at least at a moderate level in Norway, Situation 3 is really a combination of moderate participation and high budget emphasis. Consequently, Situation 3 (performance = 5.5) is superior to a mismatched combination of low budget emphasis and high participation combination (Situation 2, performance = 4.4).

Overall, the results suggest that in Norway, Singapore and Australia, organisations should adopt a strategy of a high budget emphasis evaluative style coupled with a high level of budgetary participation if they wish to enhance the job performance of their managers who are operating in low task difficulty situations. However, the ranking in terms of managerial performance for the other combinations of budget emphasis and participation is less conclusive among the three countries.

Table 7
Results of regression of managerial performance on budget emphasis and participation for low and high task difficulty subsamples

| Variable | Coeff | Low task difficulty (n=36) | | | | | | High task difficulty (n = 35) | | | | | |
| | | Equation 2 (Main) | | | Equation 3 (Two-way) | | | Equation 2 (Main) | | | Equation 3 (Two-way) | | |
		Est	t-value	p	Est	t-value	p	Est	t-value	p	Est	t-value	p
Constant	b_0	3.152	2.889	0.003	15.035	2.798	0.004	3.724	3.293	0.001	4.829	0.922	0.182
Budget emphasis (B)	b_1	0.295	2.697	0.005	-0.811	-1.616	0.058	0.078	0.933	0.179	-0.029	-0.058	0.477
Participation(P)	b_2	-0.037	-1.300	0.101	-0.410	-2.449	0.010	0.025	0.858	0.198	-0.007	-0.047	0.481
B x P	b_3				0.034	2.253	0.016				0.003	0.216	0.415
R^2		0.182			0.294			0.065			0.067		
F value		3.677			4.445			1.123			0.742		
p		0.018			0.005			0.168			0.268		
R^2 explained by interaction term					11.2%						0.2%		

Table 9
Participation and managerial performance for combinations of budget emphasis, participation and task difficulty

| Situations | Task difficulty | Budget emphasis | Participation | Participation (Theoretical) | | | Participation (Actual) | | | Std. dev | Actual managerial performance |
				Mean	Min	Max	Mean	Min	Max		
1	Low	High	High	24	6	42	37.2	33	41	2.65	5.73 (Highest)
2	Low	Low	High	24	6	42	35.6	34	39	1.95	4.40 (Lowest)
3	Low	High	Low (Medium)	24	6	42	29.7	27	32	2.07	5.50
4	Low	Low	Low (Medium)	24	6	42	25.2	13	32	7.24	5.30
5	High	High	High	24	6	42	36.6	33	41	2.77	5.55
6	High	Low	High	24	6	42	36.0	34	39	1.61	5.27
7	High	High	Low (Medium)	24	6	42	29.0	28	30	1.15	5.75
8	High	Low	Low (Medium)	24	6	42	26.1	19	31	3.92	5.22

5. Discussion

The results of this study indicate that the significant three-way interaction between budget emphasis, participation and task difficulty affecting managerial performance, found by Brownell and Dunk (1991) in Australia and Lau et al. (1995) in Singapore, was also found in Norway. There were other important similarities in the results when the nature of the three-way interaction was examined further. For instance, the results from the three studies (Brownell and Dunk, Lau et al., and the present study) indicate that in all three countries (Australia, Norway and Singapore), a significant two-way interaction between budget emphasis and participation affecting managerial performance was found in low task difficulty situations, but not in high task difficulty situations. Similarly, in all three countries, managers, operating in low task difficulty situations, were found to perform best when budget emphasis and participation were both high. Such similarities in results enhance confidence in the results and the robustness of the theory in this area of research.

Note that there are also important differences in the results. For instance, while Brownell and Dunk (1991) found that, in Australia, a compatible combination of *low* budget emphasis and *low* participation was associated with the *second* highest level of performance in low task difficulty situations, the results of this study in Norway indicate that this particular combination of budget emphasis and participation was associated with the *third* highest level of managerial performance. Similarly, with respect to high task difficulty situations, whilst both Brownell and Dunk and Lau et al. found that managers performed better with high budgetary participation than with low budgetary participation, the results of this study indicate that Norwegian managers did not perform significantly better when participation was high. However, these similarities and differences in the results of the three studies are in accordance with the predicted effects of national culture on participation.

A number of important issues were addressed in this study. First, this study attempts to ascertain if there is support for the theory first developed by Brownell (1982) and Hirst (1983) and subsequently refined by Brownell and Hirst (1986) and Brownell and Dunk (1991) pertaining to the interaction among budget emphasis, participation and task difficulty affecting subordinates' behaviour and performance. While the results of this study may differ with those of prior studies in some aspects, particularly in high task difficulty situation, the results pertaining to the *low* task difficulty situations are in general supportive of the overall theory and consistent with those of prior studies. Overall, they therefore provide further credibility to the theory in this research area.

The second issue addressed in this study is related to the choice of the task difficulty instrument. A difficult choice had to be made with respect to the task difficulty instrument. As mentioned previously, Brownell and Dunk (1991) and Lau et al (1995) had used the Van de Ven and Delbecq (1974) instrument and both had obtained relatively low Cronbach alpha scores of 0.57 and 0.41, respectively. Brownell and Dunk (1991: 694)) were confronted by a similar problem in their choice of the task difficulty instrument. They stated that: 'In attempting to extend any body of empirical research, a difficult judgement is needed by researchers; in the interests of systematic replication, does one hold all measurement choices constant, even in the face of possible questions regarding the reliability and validity of one or more of the measures?' (p.694). Different studies adopted different alternatives. Hence, while Brownell and Hirst (1987) chose to change their instrument, Brownell and Dunk (1991) chose to use the same instrument. This suggests that there is no clear-cut answer as to whether researchers should retain or change unsatisfactory instruments when undertaking replication research. Brownell and Dunk (1991:702) noted similar problems with respect to the measurement of budget emphasis, but maintained that researchers were still able to achieve 'quite remarkable' success in reconciling the Hopwood (1972) and Otley (1978) despite 'the variations of measurement of budget emphasis'.

In this study, a choice was made to change the Van de Ven and Delbecq (1974) instrument. As satisfactory Cronbach values are needed for results to be reliable, the selection of the Van de Ven and Delbecq instrument would not be helpful in this regard as this instrument has a history of poor Cronbach alpha values. Apart from the Brownell and Dunk and Lau et al. studies, other studies (eg. Withey et al., 1983; Mia, 1987) had found similar difficulty with this instrument. A different instrument was therefore needed to improve the Cronbach alpha value to enhance the validity of the results of this study.

A different task difficulty instrument, namely, the Daft and Macintosh (1981) instrument, which has a record of satisfactory Cronbach alpha values, was available. This instrument, along with a number of other task characteristics instruments, had been tested vigorously by Withey et al. (1983) for convergent and discrimant validity. They concluded that the Daft and Macintosh (1981) instrument is one of the best instruments to use in research. The results of Withey et al. (1983) indicate that the Daft and Macintosh instrument was very similar to the Van de Ven and Delbecq instrument in terms of their measurement properties and their abilities to operationalise the two Perrow's (1967) dimensions of analysability and exceptions. In the Withey et al.

(1983) study, items from both instruments loaded in similar manner in a factor analysis, leading them to conclude that 'separate investigations that operationalised Perrow's two dimensions probably were measuring similar phenomena' (1983:52). With respect to convergent validity, they found that the two instruments correlated positively and significantly with a high correlation coefficient of 0.8. The results of a number of tests for discriminant validity were also at satisfactory levels. Additional tests undertaken by Withey et al. involving comparison of questionnaire responses results with the evaluations of work units by independent external raters, indicated that the work unit evaluations by both the Macintosh and Daft instrument and the Van de Ven and Delbecq instrument had the highest level of agreement with the work unit evaluations made by independent external raters.

Overall, these results suggest that these two instruments are measuring the same phenomena. Hence, while the use of identical measurement instruments among different studies is useful for the comparison of results among studies, the use of a different task difficulty instrument in this study has the advantage of overcoming the problem of low Cronbach alpha values associated with the Van de Ven and Delbecq instrument, while it still permits the results of this study to be compared with those of prior studies with confidence as there is strong evidence in the results of Withey et al. (1983) to indicate that the two instruments are measuring the same phenomena.

The choice of a different task difficulty instrument in this study also provided evidence to ascertain if the results of Brownell and Dunk (1991) and Lau et al. (1995) were affected by the weaknesses of the Van de Ven and Delbecq instrument. While keeping all the known conditions as close to the original study as possible (ie. 'close' replications) may be suitable early in the early phases of the research program, Lindsay and Ehrenberg (1993:221) suggest that 'as an area becomes better understood...the value of further close replication diminishes and we need more differentiated ones'. They further argue that 'differentiate' replication, which involves deliberate variation of conditions, is a necessary part of 'convergent validity or triangulation, namely that by performing studies that use different methods... for example, *different measurement instrument*...one obtains confidence that the result is due to the conceptual variables under study and not just an artefact either of the persons conducting the study...or of the particular manner in which the original study had been conducted.' (Lindsay and Ehrenberg: 221) (italics added.) Similarly, Lindsay et al. (1998) argued that while the use of the same instrument to operationalise a construct is desirable in a 'close' replica-

tion, the use of different instruments to operationalise the same construct in a 'differentiated' replication may be helpful to ascertain if there is convergence across the different measures. With respect to this study, a satisfactory Cronbach value of 0.77 was obtained and support was found for the theory in *low* task difficulty situations. It is therefore possible to conclude that the results of Brownell and Dunk and Lau et al., *so far as the low task difficulty situations were concerned*, were not due to the fluke of an unreliable instrument. Hence, the theory *pertaining to the low task difficulty situations* is very robust as similar results were obtained with not only two different task difficulty instruments, but also despite the weaknesses of one of the instruments, namely, the Van de Ven and Delbecq instrument.

Note that although the results of this study in Norway are relatively similar to those of Brownell and Dunk and Lau et al. in low task difficulty situations, they are different for the high task difficulty situations. These differences are, however, in accordance with the expected impact of culture as this study was undertaken in a different cultural environment. This deliberate variation in cultural environment provides a test for what Lindsay and Ehrenberg (1993:221) regard as 'a search for *exceptions*'. According to them, a crucial aspect of undertaking replication research, particularly 'differentiated' replications, is to search for those conditions under which the generalisation will *not* hold. They argue that with a 'close' replication, one generally expects the same result to recur. However, with a 'differentiated' replication, the researcher changes the conditions and 'expects the result to break down, but wants to establish this empirically' (1993:222). Accordingly, with respect to this study, exceptions were not expected to occur with those results relating to *high* participation situations since high participation exists in Norway. In contrast, expectations were expected to occur with the results pertaining to low participation situations since *low* participation is rare in Norway. As the results of this study are generally supportive of these expectations, it can be concluded that the underlying theories tested in this study are generally sound.

6. Conclusions

This study has undertaken a comparison of the results of this study with those of two similar prior studies undertaken in Australia and Singapore. However, this is not the only purpose of this study. This study was also motivated by the need to examine some of the effects of national culture overlooked by prior studies. In particular, the effect of the diversity within culture on participation is the focus of this study. The low diversity within the Norwegian culture suggests that Norwegian man-

agers' participation is expected to range from *medium* to *high*, rather than from *low* to *high*. Since *high* participation situations are common in Norway, prior studies' findings pertaining to *high* participation situations are expected to be supported in Norway. In contrast, since *low* participation situations are rare in Norway, prior studies' findings pertaining to *low* participation are unlikely to be supported in Norway. These expectations are supported by the results of this study. These results provide support for the possible generalisation of many other prior studies' findings pertaining to high participation to the Nordic and other cultural regions where high participation is common. In contrast, care must be exercised when generalising other prior studies' findings pertaining to low participation situations to the Nordic and other cultural regions as these results may not be generalisable to these cultural regions where low participation is rare.

A number of limitations may influence the results of this study. First, the sample of this study was drawn from the oil and gas industry whilst those of both Brownell and Dunk (1991) and Lau et al. (1995) were drawn from the manufacturing sector. Differences in the two sectors could have influenced the results. Second, as discussed earlier, different instruments were also used to measure task difficulty. The Van de Ven and Delbecq (1974) instrument was used by both Brownell and Dunk (1991) and Lau et al. (1995), whereas the Daft and Macintosh (1981) instrument was employed in this study. Third, consistent with Brownell and Dunk and Lau et al., we selected our sample from functional heads. As these are relatively senior management positions, it is possible that a considerable extent of informal controls may exist between the superiors and the subordinates. Hence, the impact of formal controls, such as budget emphasis, may be less important at these levels of management. Hence, the replication of this study with a sample drawn from lower ranking managers may be an important contribution to this research area. The consideration of the effects of informal controls may also be worthwhile. Next, our results could also have been influenced by omitted variables, such as budget adequacy and organisational commitment (Nouri and Parker, 1998). Opportunities also exist to examine the impact of industrial relations on accounting control systems since such issues are yet to be fully explored. For instance, studies on the impact of the industrial relations on budget emphasis and budgetary slack would be interesting and worthwhile.

Finally, even though extreme care was used to translate the questionnaire from English into Norwegian, it is possible that some translation errors may still have occurred as it was not possible to achieve total accuracy in questionnaire transla-

tion because of the inherent differences in meaning of words in different languages.

Nevertheless, despite these limitations, this study has attempted to extend two important areas in management accounting research, namely, (i) the impact of superiors' evaluative style on subordinates' performance; and (ii) the impact of national culture on control systems. While the impact of superiors' evaluative styles on subordinates' job-related attitudes, behaviour and performance has been the focus of many prior studies, there is a dearth of research in this area of research in continental Europe in general and the Scandinavian countries in particular. The results of this study therefore constitute not only an important additional source of empirical evidence in this area of research; they also represent the first empirical evidence from the Scandinavian region on the complex relationships between budget emphasis, participation and task difficulty and managerial performance. The evidence uncovered in Norway may provide important insights into the control systems and behaviour of managers from a region, which is different from those on which many prior studies in management accounting were based. Finally, the investigation on the effects of a previously untested aspect of national culture, namely the diversity within culture of the range of budgetary participation among Norwegian managers, provides important and interesting insights into effects of national culture on control systems. Many research opportunities exist to explore this interesting aspect of national culture on various accounting issues.

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Disclosure of proprietary information in the course of an acquisition

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Abstract – Proprietary information plays a crucial role in the process of selling a firm or an operation, particularly if the prospective buyer is a competitor. Favourable information increases the selling price, but increases competition in case the buyer does not buy, and *vice versa*. This paper explores equilibrium disclosure strategies in such a setting. If the information is verifiable then a high degree of uncertainty as to the buyer's intention or alternatives results in less disclosure. If the information is unverifiable then a high degree of uncertainty is necessary for any information transfer in equilibrium. If information can be verified by the seller, in equilibrium this will generally drive out unverified disclosure.

1. Introduction

Suppose for some reason, the owner of a firm wants to sell the firm or a separate operation, e.g. for strategic reasons such as concentration on core competencies, or for personal reasons. A prospective buyer indicates her willingness to buy. She usually expects to receive as much proprietary information about the firm as possible to evaluate whether or not to agree to acquire the firm. Such information includes financial and management accounting information, planning and forecasting information, budgets, information about the products, customers, markets, technologies, know how, cooperations, management capabilities, human resources, and the internal organisation. The quality of such information varies. Financial accounting information is usually verified, while budgets and forecasts are generally unverifiable.

Things get more complicated if the prospective buyer is a current competitor of the firm or the operation, because the information might be used against the firm if the competitor eventually does not agree to the acquisition. The objective of this paper is to provide some insight into the question, how much information and of what quality should the seller disclose in the course of the negotiation to such a current competitor? This question is relevant for accountants in both firms who are usu-

ally involved in such negotiations. They possess knowledge of the information available or can appreciate the value of information, respectively, and are also involved in valuing the firm. It is also relevant for auditors who often undertake due diligence analyses.

The standard recommendation is that the seller should conceal his information as much and for as long as possible because there is no certainty that the acquisition will take place. The reason is that disclosure of proprietary information is typically considered to undermine the bargaining position of the seller. To reduce the negative effects of information that is learned during negotiations, in practice, the interested parties in the deal may agree to keep the information secret; this may even include the intent to sell or buy, non-compliance of which is brought into courts. However, non-compliance is often difficult to prove, particularly if the information is of a 'soft' type. Another way to incorporate information into the negotiations without disclosing it directly, is to make a contingent contract with, say, a price that depends on the information – e.g. the future sales or profit after tax for the next three or so years (earn-out agreements). Then no disclosure is required, but the information will be used *ex post* to determine the final price. A major disadvantage of a contingent contract is that it may induce inefficient decisions because agency problems arise between buyer and seller within the observation period covered by the covenant. In many jurisdictions, there are also legal restrictions against concealment of information that would likely discourage the buyer to agree to the deal (e.g. good faith). In most situations, though, the seller has a great deal of discretion whether to pass information to the prospective buyer or not.

This paper analyses disclosure strategies in a game-theoretic model with incomplete information. Equilibrium disclosure strategies for both verifiable and unverifiable information are charac-

*The author gratefully acknowledges helpful comments by Doug Nelson, Thomas Schildbach, Ken Peasnell (the editor), anonymous reviewers, and participants at the public economics workshop at the University of Graz, the EIASM Workshop on Accounting and Economics in Zurich and the conference of the Ausschuss 'Unternehmenstheorie und politik' of the Verein für Socialpolitik in Bendorf. Correspondence should be addressed to Professor Wagenhofer at the Institute of Management Accounting and Control, University of Graz, Universitaetsstrasse 15, A-8010 Graz, Austria. Tel. +43 (316) 380 3500, Fax. +43 (316) 380 9565. E-mail: alfred.wagenhofer@kfunigraz.ac.at.

The final version of this paper was accepted in May 2000.

terised. Intuitively, the following trade-off determines what and how much information is being disclosed: if the seller possesses favourable information then he would want to disclose that information because it increases the selling price. On the other hand, if the acquisition does not go through, the same information becomes detrimental to the owner because the competitor can use that knowledge in the product market to the disadvantage of the firm. The argument runs *vice versa* in case the seller possesses unfavourable information: disclosure lowers the selling price but improves the firm's position *vis-à-vis* the competitor in case the acquisition does not occur. If there is a high degree of uncertainty with respect to the intention of the prospective seller and her alternatives, respectively, it is unclear which of the two effects dominates. This tension has a strong influence on the disclosure strategies and the way the buyer rationally interprets the disclosure and non-disclosure.

The main feature of this paper is that it explores disclosure strategies for both verifiable and unverifiable information in the very same setting. This offers the opportunity to study how the quality of information drives the disclosure. In the case of verifiable information, sufficient buyer scepticism with respect to the information withheld by the seller induces full disclosure as long as the seller is relatively certain about the intention of the buyer, i.e. whether she will actually buy or not. If there is a high degree of uncertainty then the seller discloses less or even no information at all. Thus, an 'inscrutable' prospective buyer receives less verifiable information than if she indicates clearly her intention.

If the information is unverifiable, generally, the buyer would not believe any information the seller discloses. The seller has an incentive to present exactly that information which promises the highest return. If he is uncertain about the buyer's intention, however, this need no longer hold. Again, the countervailing goals the seller has may offset, and his incentive to bias the information vanishes. In contrast to verifiable information, every equilibrium is a partitioning equilibrium in the sense that the seller truthfully indicates only a range of possible values of his information, e.g. comparative information such as high/low, good/bad, or favourable/unfavourable. Sufficient uncertainty about the buyer's intention is necessary for any information flow between seller and buyer. Hence, in order to elicit information the buyer must be 'inscrutable'. A comparison of the equilibria offers some insights into the value of verification, and thus, the demand for auditing in such a setting.

The particular situation of buyer–seller negotiations about an acquisition has hardly been an issue in the literature. However, there are several papers

in the accounting literature which consider disclosure of information in related settings. The driving force behind most of the results in the verifiable information models is the unravelling principle (e.g. Akerlof, 1970, Milgrom, 1981). The sceptical beliefs in case of non-disclosure induce the informed party to reveal its private information in equilibrium. The basic model has been extended to cover disclosure costs (e.g. Verrecchia, 1983), costs of competition (e.g. Feltham and Xie, 1992, Hayes and Lundholm, 1996, Wagenhofer, 1990), labour union negotiations (Frantz and Walker, 1997), and uncertainty with respect to whether the informed party has received information (e.g. Dye, 1985, Jung and Kwon, 1988), among others. These extensions induce countervailing effects of disclosure and explain why not always all verifiable information is revealed in equilibrium. Dontoh (1989) studies disclosure of verifiable information in a duopoly game in which the competitor is uncertain as to the objectives of the informed firm. He derives an equilibrium in which the firm, dependent on its actual objectives, discloses either favourable or unfavourable information. Different from that, this paper considers uncertainty of the uninformed party's type. Thus, an equilibrium disclosure strategy does not differentiate among types and contrasts with its properties.

Disclosure of unverifiable information is analysed in so called 'cheap talk' games (e.g. Farrell, 1987, Farrell and Gibbons, 1989). These games always have a non-disclosure equilibrium in which any information the informed party gives is ignored by the receiving party. In many situations, there exist other, informative equilibria in which partitions of the range of possible information are disclosed. Closely related to this paper is Gigler (1994) who studies disclosure of unverifiable information by a firm which wants to issue stock to raise capital but has to compete in a *Cournot*-duopoly.[1] The results shown here are structurally similar to his. A difference to this paper is that there is no change of the market structure after disclosure, the duopoly situation continues and, hence, no surplus and bargaining issues surface. Other literature, e.g. Gertner et al. (1988), and Rajan and Sarath (1996), uses signalling models to transfer information to two audiences where certain firms have an incentive to disclose truthfully.[2]

Effects of the quality of information on disclosure strategies have been studied by Verrecchia (1990). He defines quality of the information as

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[1] In a related paper by Newman and Sansing (1993) a firm wants to inform shareholders about the liquidating value of the firm correctly, but must consider the effect of that information on entry deterrence.

[2] Countervailing incentives are analysed in a contractual setting in Lewis and Sappington (1989), among others.

the precision of the information with respect to the underlying economic variable. The main result is that the higher the quality of the information, the more information is (*ex ante*) disclosed in equilibrium. However, the signal disclosure is always verifiable. Penno (1997) assumes that the probability a firm has information decreases as the precision of that information increases, and shows that there are situations in which the precision of information is negatively related to the frequency of disclosure. Both papers assume that the quality of information is verifiable, whereas this paper considers verifiable and unverifiable information.

The rest of the paper is organised as follows: the next section introduces the model. Section 3 explores disclosure strategies of verifiable information, Section 4 those of unverifiable information. Section 5 compares the desirability of verifying information. Finally, Section 6 contains a summary and conclusions.

2. The model

There are two firms in a product market: the firm whose owner wants to sell the firm (or an operation) as a whole, and the other firm which indicates an interest in acquiring the firm. Currently, both firms are competitors in a *Cournot*-duopoly.[3] The acquiree, indexed by S for seller, and the prospective buyer, indexed by B for buyer, produce homogeneous goods or close substitutes. The inverse demand function is assumed to be linear,

$$p = \alpha - (x_S + x_B) \tag{1}$$

where α is a demand parameter which indicates the size of the market. The price p of the product depends on the total quantity offered, x_S (x_B) denotes the quantity produced and sold by the seller (buyer). Both firms select their production quantities simultaneously.[4]

Production costs are linear in quantity and equal for both firms. Firms (their decision makers, respectively) are risk neutral, hence, fixed costs are not relevant for decision-making, and are set to zero henceforth. The profit for firm $i = S, B$ is

$$\pi_i = (p - k) \cdot x_i = (\alpha - k - x_S - x_B) \cdot x_i$$

where k denotes the constant common unit cost.

The seller possesses private information about the product market (α) and/or about the production cost k which is assumed to be relevant for both firms. The information is denoted $y = (\alpha - k)$, and is restricted to the range $Y = [1, 2]$ to facilitate explicit computations. A priori it is common knowledge that y is identically distributed in Y, i.e. $f(y) = 1$ for all y. The selling firm possesses the information y while the competitor only knows that the seller knows y, a fact that is common knowledge. The information is relevant for determining a price for the firm in case the acquisition occurs, and it is relevant for determining the production strategies of the firms in the *Cournot*-duopoly otherwise.

The seller is uncertain whether the competitor will actually acquire the firm. This uncertainty is modelled by $\phi \in [0, 1]$ which is the probability that the competitor will ultimately acquire the firm (depending on the terms of the contract). This probability function is common knowledge. The probability may depend on the proprietary information, $\phi(y)$ and $\phi(Z) = E[\phi(y) | y \in Z]$ for sets $Z \subseteq Y$, respectively. The functional form of ϕ is a result of many factors, including the terms of the acquisition and the alternatives of the buyer if she does not acquire the firm. Different forms of $\phi(\cdot)$ will be considered in the paper.[5] For example, the prospective buyer may have various alternatives to acquiring the particular firm. The choice which investment to undertake depends on the profitability of the alternatives which is typically uncertain at the beginning of the negotiations. In such a case, the probability $\phi(\cdot)$ can depend on the information because a high y may make some alternatives less profitable or *vice versa*. An example would be that good information in this product market reduces the expected profitability of other product markets which are acquisition targets of the buyer. This could be captured by a probability $\phi(\cdot)$ which increases in y. Another example is that the prospective buyer is subject to financial constraints, so that the cost of financing the acquisition increases with a higher price. This would imply that the probability $\phi(\cdot)$ decreases in y as the price increases in y. A different source of uncertainty with respect to the intention of the prospective buyer is that acquisition decisions are often made by a team of persons, e.g. the board of directors.

Figure 1 shows the sequence of events. If the acquisition does not go through, the two firms remain competitors in the product market. Information leaking during the negotiation may

[3] Duopoly structures are often used to describe in a tractable way the effects of disclosure of accounting numbers in a competitive environment. The assumption of a duopoly does not in itself constitute a major force to obtaining the subsequent results; all that is necessary is a predictable way of the effects of the information on competition. An extension to more than two competing firms in the product market is straightforward.

[4] *Cournot*-competition seems to be rather unrealistic. An alternative is *Bertrand*-competition in which both firms determine their prices, and meet the resulting demand afterwards. However, *Cournot*-competition may result if the game is extended to include capacity decisions before prices are determined. See, e.g. Tirole (1988: 228–232).

[5] It would be possible to endogenise ϕ along the lines mentioned in the text so that it comes out of a particular decision situation the buyer faces. The main reason for not doing so is that such a setting would still be exogenous at an earlier stage, and it would preclude considering the full range of ϕ-functions in describing the equilibria.

Figure 1
Sequence of the game

| Seller knows y and decides on disclosure | Buyer infers information about y and observes her type | Buyer agrees to acquire the firm or remains competitor | Firms in product market decide on production quantities | Outcomes obtain |
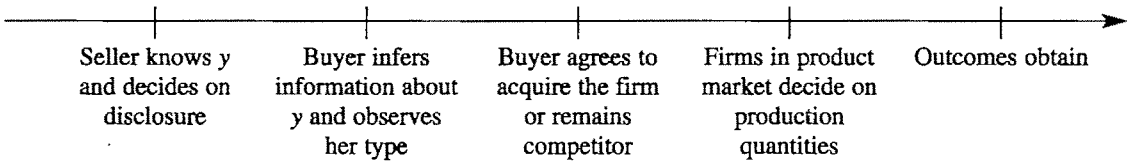
have positive or negative effects on the quantities and profits of the two firms, depending on the contents of the information. Information indicating favourable market or cost situations (i.e. high y) has generally a negative effect on S's profit since B adjusts her production quantity upwards relative to not knowing the information, and *vice versa*.

Formally, the optimal production quantity is determined by the necessary first-order condition of S's profit, $\pi_S = (y - x_S - x_B) \cdot x_S$ with respect to x_S, given a quantity x_B,

$$\frac{\partial \pi_s}{\partial x_s} = y - 2x_s - x_B = 0 \quad \text{and} \quad x_s(y) = \frac{y - x_B}{2} \quad (2)$$

This holds similarly, but with reversed indices, for B. In a *Cournot*-equilibrium both choose their production quantities simultaneously. If B infers that $y \in Z$, with $Z \subseteq Y$, she will choose her production quantity as $x_B(Z)$. Z will be determined in the particular equilibrium. For example, in the case of full disclosure of verifiable information, $Z = \{y\}$. The informed seller produces

$$x_s(y, Z) = \frac{y - x_B(Z)}{2}$$

and the competitor B

$$x_B(Z) = \frac{E[y|Z] - E[x_s|Z]}{2} = \frac{E[y|Z] - \frac{E[y|Z] - x_B(Z)}{2}}{2}$$

where E is the expectation operator, and $E[y|Z]$ is short for $E[y \mid y \in Z]$, denotes the expected value of those y which must have occurred given Z was disclosed or inferred. This expression results in

$$x_B(Z) = \frac{E[y|Z]}{3}$$

The optimal quantity of S becomes

$$x_s(y, Z) = \frac{y - \frac{E[y|Z]}{3}}{2} = \frac{y}{2} - \frac{E[y|Z]}{6}$$

resulting in a profit of

$$\pi_s(x_s(y, Z), x_B(Z), y) = \left(\frac{y}{2} - \frac{E[y|Z]}{6}\right)^2 \quad (3)$$

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[6] Possible restrictions from anti-trust regulation are assumed not to apply.

If, on the other hand, the two firms agree to the acquisition the market structure changes to a monopoly in which the buyer is the only supplier of the good.[6] The inverse demand function becomes

$$p = \alpha - x$$

The buyer B maximises her profit $\pi_M = (p - k) \cdot x = (y - x) \cdot x$ by producing and marketing the quantity $x_M = y/2$. The index M indicates the monopoly situation. Monopoly profit is

$$\pi_M(y) = \frac{y^2}{4}$$

since, after the acquisition, the buyer knows the information y. The acquisition decision, though, is based on the *ex ante* information Z inferred by B in equilibrium. The expected future profit just before the acquisition is

$$\pi_M(Z) = \frac{E[y^2|Z]}{4} \quad (4)$$

And the expected profit of the seller in case of the acquisition is the maximum the buyer pays which is

$$E[\pi_M - \pi_B | Z] = \frac{E[y^2|Z]}{4} - \frac{E[y|Z]^2}{9} \quad (5)$$

To focus on the effect of information disclosed by the seller, the bargaining game about sharing the surplus from the acquisition is not modelled in detail. Rather, it is assumed that the seller captures the full (expected) surplus from the monopolisation. The buyer is passive in the sense that she is not fooled by the disclosure but holds rational expectations on the information in equilibrium. This bargaining result is supported by the following sequence of moves in a game of incomplete information: the seller, simultaneously to disclosure, makes a take-it-or-leave-it offer with a price under which he precommits to agree to the acquisition. The buyer only needs to check whether this price is fair given the private information disclosed or inferred in equilibrium. This assumption avoids several considerations which might occur if different extensive forms of a multi-stage game are imposed.[7] It should be noted that the disclosure strategy is sensitive to the resulting price and the share of the surplus. Other assumptions, however,

would probably not affect the general structure of the equilibria derived in this paper.

3. Disclosure of verifiable information
3.1. Equilibrium strategies

Information is verifiable if there exist other persons beside the informed seller who can observe the truthfulness of the information either directly at disclosure or at a later date and can penalise the seller in case the information was found not truthful. Verified information has already been checked by such a third person. Provided the expected penalty is sufficiently severe the seller will disclose any information truthfully, i.e. if the disclosure is a set $Z \subseteq Y$ then $y \in Z$, and if Z is a singleton, $\{z\}$, then $z = y$.

Examples for verifiable information include data on past transactions, particularly those recorded in the financial accounts. Auditing of financial information is a procedure to ensure verification. In typical acquisitions, auditors prepare due diligence reports that are aimed at providing verified information. Another example is information that becomes verifiable by the seller at a later date. The contract can provide guarantees for specific events, or it can be made contingent on such events.

Uncertainty about the buyer's intention to acquire the firm or not ($0 < \phi < 1$) creates countervailing incentives for the seller: if the buyer agrees to the acquisition the seller would want to disclose favourable information (high values of y), because favourable information increases the price obtained by selling the firm, but conceal unfavourable information. If the buyer does not acquire the firm and remains a competitor, the seller would want to conceal favourable information because he can exploit the situation in which the competitor makes an uninformed, and too low, quantity decision. Indeed, for a sufficient degree of uncertainty, the buyer is unable to infer whether it is very favourable or very unfavourable information the seller does not disclose.

The decision to disclose or conceal verifiable information must take into account what the buyer infers from non-disclosure. Let N denote the subset of Y which contains all $y \in Y$ which are not disclosed in equilibrium. In an equilibrium, the seller must have an incentive to conceal all $y \in N$ and disclose all $y \in Y - N$. The seller has an incentive

to disclose any information y that satisfies

$$\frac{5\phi}{36} \cdot y^2 + \frac{1-\phi}{36} \cdot (3y-y)^2 > \frac{\phi}{36} \cdot (9E[y^2|N] - 4E[y|N]^2) + \frac{1-\phi}{36} \cdot (3y - E[y|N])^2$$

The equilibrium non-disclosure set N is then implicitly defined as

$$N = \left\{ y \mid (4+\phi) \cdot y^2 \leq \phi \cdot (9E[y^2|N] - 4E[y|N]^2) + (1-\phi) \cdot (3y - E[y|N])^2 \right\} \quad (6)$$

Proposition 1 describes the equilibria for the case that the probability ϕ with which the buyer will actually acquire the firm, is independent of the information y.

> *Proposition 1: Assume information is verifiable and ϕ is a constant.*
> *(i) There exists a full disclosure equilibrium if $\phi < 1/6$ or $\phi > 3/8$.*
> *(ii) If there exists a partial disclosure equilibrium then $N = [1, y_1] \cup [y_2, 2]$.*
> *(iii) A non-disclosure equilibrium exists if $0.2209 < \phi < 0.3459$ (rounded).*

The proof is in the Appendix. If it is likely that the buyer will actually acquire the firm, i.e. ϕ is relatively 'high', the purchase price effect of the information y outweighs the potential negative effect on competition. The buyer holds sceptical beliefs with $N = \{1\}$ which would result in the lowest purchase price given non-disclosure. These beliefs induce the seller to disclose all information. Proposition 1 (i) gives a sufficient condition for the probability ϕ such that full disclosure is an equilibrium, namely $\phi > 3/8$.

If it is likely that the buyer will refrain from acquiring the firm, the negative effect of favourable information on competition dominates the potential positive acquisition price effect. The prospective buyer will hold beliefs upon non-disclosure of $N = \{2\}$ which is the worst case for the seller in case the duopoly continues. This belief triggers full disclosure. The condition in Proposition 1 (i) for the existence of such an equilibrium is $\phi < 1/6$.

If none of the two forces clearly dominates, equilibria other than full disclosure can occur. The second part of Proposition 1 shows the structure of such equilibria: the trade-off between the positive and the negative effects of information on price and competition results in the concealment of very favourable and very unfavourable information. In equilibrium, if information at all is disclosed, this must be 'average' information. The reason for this form of the equilibrium strategy lies in the fact that extreme values of information have an increasingly negative effect while the positive effect grows more slowly. Thus, 'the net effect is a concave function, which means that the negative effects are most pronounced at the boundaries of the information set.

Finally, part (iii) of Proposition 1 shows that

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[7] Difficulties occur only in the case that the buyer does not become informed about y. Generally, inefficient trade and ambiguous results may occur due to the incomplete information. For example, if the uninformed buyer moves first, the seller might wait for a better offer at a later stage, and if the informed seller moves first, he would be concerned about information leakage in the offer itself which might reduce bargaining power. For a discussion of these bargaining games see, e.g., Fudenberg and Tirole (1991: ch. 10).

Figure 2
Disclosure equilibrium for verifiable information
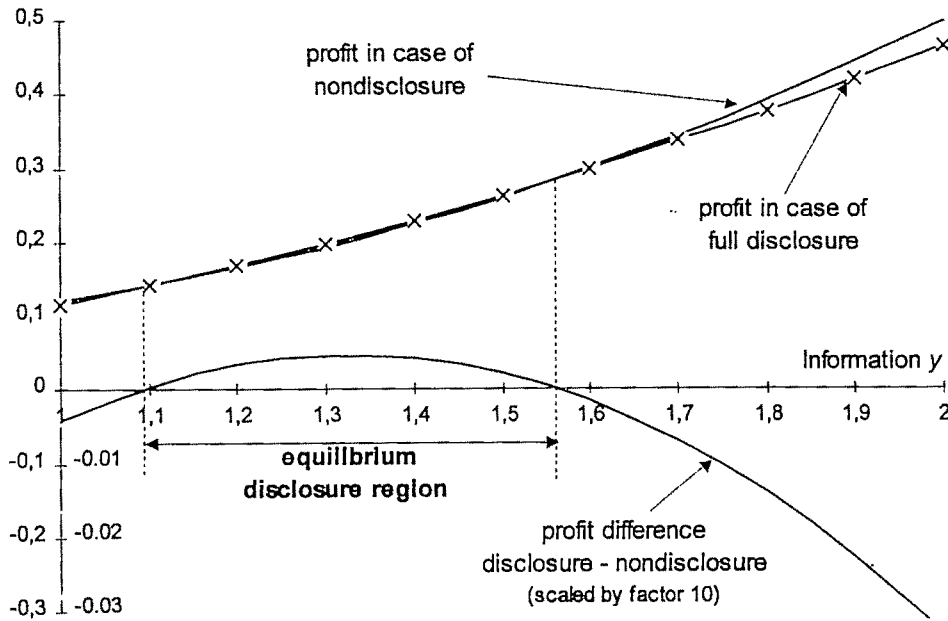
non-disclosure of any information is an equilibrium for a non-empty set of parameters ϕ. This result is not very common in the disclosure models; here it depends on the curvature of the involved profit functions.

The proposition gives a detailed result for the case that the probability ϕ that the buyer will acquire the firm is a constant. It is more difficult to present precise results for more general probability functions, but the main result that the probability ϕ must not be close to 0 or 1 so that a partial-disclosure equilibrium emerges still holds. In general, multiple equilibria may occur; such a situation will be shown in an example in the sequel. There have been many attempts to refine the Bayesian Nash equilibrium concept, but their power to eliminate some of the equilibria is low in this setting because there are no out-of-equilibrium beliefs required to sustain the equilibria.[8] Note that even the extreme beliefs $N = \{1\}$ or $N = \{2\}$ are viable beliefs because a type $y = 1$ or 2 is just indifferent between disclosure and non-disclosure. While there is a sequential structure of moves these are essentially equivalent to simultaneous moves because the beliefs of the buyer and the disclosure strategy are simultaneously used to arrive at one of the equilibria. However, the preferences of the buyer and the seller for certain types of equilibria are clear.

Corollary 1: (i) The seller strictly prefers an equilibrium with partial disclosure to an equilibrium with full disclosure. (ii) The buyer prefers an equilibrium with full disclosure to an equilibrium with partial disclosure.

The proof follows from the definition of the non-disclosure set N in (6). For a given $y \in N$ the expected profit upon non-disclosure is always greater than upon disclosure. While this result holds *ex post*, it would also hold *ex ante* since the profit functions are strictly convex in y.[9] However, given the seller already has the proprietary information this is not relevant any more; it would create an incentive, though, to precommit to not receiving information or to non-disclosure. The preferability of equilibria is just reversed for the prospective buyer: she benefits from more accurate information *ex ante*. She benefits always if she competes in the duopoly, and is indifferent if she

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[8] An application of refinements on a related issue can be found in Feltham and Xie (1992: 67–69).

[9] This is a standard result in models of this kind. See, e.g. Gal-Or (1985).

[10] In cheap talk games such as this one, the disclosure need not be a subset of Y, it can be any other arbitrary message that is linked to the information that is sent. However, without loss of generality, the literal meaning of a message is used here. For a discussion see Farrell (1993).

[11] See, e.g., Seidman (1990: 445).

actually acquires the firm. It is more difficult to rank different partial-disclosure equilibria because this depends on the particular information y the seller holds.

3.2. Illustrative examples

To illustrate the properties of a partial-disclosure equilibrium described in Proposition 1, consider an example with $\phi = 0.2$. The non-disclosure region in equilibrium is

$$N = [1, 1.0887] \cup [1.5625, 2]$$

(values rounded). The expected value of the information upon observing non-disclosure is $E[y \mid N] = 1.6570$. The profit functions for disclosure and non-disclosure with these equilibrium beliefs are depicted in Figure 2. They are both convex in the information, and cross twice at the points $y_1 = 1.0887$ and $y_2 = 1.5625$. The profit difference curve confirms that this is an equilibrium. Disclosure is preferable to non-disclosure exactly in the disclosure region that defines N which, itself, determines the non-disclosure curve.

If the probability of acquisition ϕ is a function of the information disclosed or inferred multiple equilibria in pure strategies may occur. Consider the following example:

$$\phi(y) = 0.81 - y/3 \tag{7}$$

The probability of acquisition decreases with more favourable information, e.g., because the buyer incurs higher financing costs if she must finance the resulting greater price. If the information is very unfavourable, $y = 1$, the probability of an acquisition is 0.477, it decreases linearly in more favourable information until it reaches 0.143 for the most favourable information $y = 2$. If the seller does not disclose the probability is calculated by using the expected value, $\phi(N) = 0.81 - E[y \mid N]/3$.

In this setting there simultaneously exist four different equilibria:

(i) full disclosure with $N = \{1\}$,
(ii) full disclosure with $N = \{2\}$,
(iii) partial disclosure with $N = [1, 1.0154] \cup [1.8058, 2]$ and $\phi(N) = 0.1976$,
(iv) partial disclosure with $N = [1, 1.2748] \cup [1.9861, 2]$ and $\phi(N) = 0.4171$.

The reason is that the profit functions for disclosure and non-disclosure are bent differently by the induced change of the probability of acquisition $\phi(\cdot)$. The basic structure of equilibria persists. Obviously, the prospective buyer benefits from more information, and she would be able to induce full disclosure if she could precommit to hold 'extreme' beliefs. The seller prefers partial-disclosure equilibria. In the example, the seller *ex post* prefers equilibrium (iv) for low values of y and equilibrium (iii) for high values of y. In the 'middle' range of Y both equilibria prescribe disclosure and, thus,

there is no strict preference ordering there. This implies that the selection of equilibria would contain information; however, the selection is not observable by the buyer if no disclosure occurs.

If the disclosure is enriched from a singleton to a set $Z \subseteq Y$, the buyer holding sceptical beliefs must infer the $y \in Z$ which results in the lowest profit for the seller. Then all earlier results go through. Thus, the disclosure of partitions or unconnected sets of information does not change the structure of equilibria.

4. Unverifiable information
4.1. Equilibrium strategies

The analysis so far assumed that information was verifiable. Much information relevant for evaluating an acquisition, particularly planning and forecasting information, is unverifiable. Unverifiable information is information whose truth cannot be judged by either the buyer or a third party, e.g., a court, or both. Hence, it cannot be contracted upon, any contract based on such information would not be enforceable. If the seller discloses such information the buyer cannot be sure whether it is biased or not. Even if the realisations of such variables can be observed in the future, a deviation is no evidence that the disclosure was biased. Hence, a covenant which is sensitive to such a variance, increases the risk of the seller but induces no incentive for truthful disclosure. The seller has full discretion about what to disclose, which means the disclosure Z may be an arbitrary subset of the range Y.[10]

Suppose the buyer's decisions are sensitive to different disclosures Z. Then the seller has a strict incentive to disclose that Z which induces a reaction that is most preferred by the seller. This disclosure would be independent of the actual information y the seller possesses. Thus, there must be an equilibrium in which rational expectations of the prospective buyer mandate ignoring any message by the seller concerning unverifiable information, and acting according to her prior expectations. Given the buyer ignores Z, the disclosure strategy becomes arbitrary. The seller may refrain from disclosing anything, he may even disclose the true information. As long as the buyer cannot be certain of the truthfulness she must not act on that information. Otherwise the seller would not tell the truth any more.

Such an uninformative equilibrium type ('babbling equilibrium'[11]) exists in every cheap talk game. This result is in contrast to the disclosure equilibria of verifiable information even though the basic reason is similar. If the seller is known to prefer to disclose either favourable or unfavourable information, he would do so if it helped change the beliefs of the buyer accordingly. In the special cases $\phi = 0$ and $\phi = 1$, which means cer-

tainty with respect to the intention of the prospective buyer, the uninformative equilibrium must be the only equilibrium. If the buyer acquires the firm for sure, the seller would want to make her believe that the information is most favourable to maximise the purchase price. This comes at no cost because the buyer will buy anyway. The reverse holds if the prospective buyer has no interest in buying the firm, but continues to be a competitor. Then the seller would want her to believe that his information is unfavourable.

Uncertainty on the side of the seller whether the buyer will acquire the firm, leads to countervailing incentives. They can provide a basis for the buyer to believe information disclosed by him.[12] It has been shown in several papers, including Crawford/Sobel (1982), Sobel (1985), Melumad/Shibano (1991), Newman/Sansing (1993), and Gigler (1994), that any disclosure strategy of an informative equilibrium must be a step function defined on Y.[13] The range Y is divided into n partitions,

$$Y_1 = [1, y_1], Y_2 = (y_1, y_2], ..., Y_n = (y_{n-1}, 2] \quad (8)$$

with $1 < y_i < y_j < 2$, $i < j$.[14] The disclosure is a constant for each $y \in Y_i$ but otherwise arbitrary, e.g., the seller might disclose any $z \in Y_i$, $Z \subset Y_i$, or disclose the set Y_i itself (which is assumed without loss of generality). In equilibrium, there cannot exist a set of y which are disclosed truthfully as singletons, i.e. $Z = \{y\}$, because for any y in that set, there would be another y' that induces a higher expected profit for the seller if he disclosed y' instead. Examples of such disclosures are comparative statements such as: 'We expect an increase in sales of at least 10 %.', alternatively, the disclosed sales budget includes an increase of 14 % if these numbers are within the equilibrium partition. Whatever the disclosure is, the rational buyer must revise her expectation from the a priori $E[y]$ to $E[y \mid Y_i]$.

An equilibrium requires that the seller has no incentive to deviate from disclosing the partition Y_i if $y \in Y_i$. Proposition 2 records the main result of this section.

Proposition 2: If information is unverifiable then any informative equilibrium must be a partition-disclosure equilibrium as defined in (8). A necessary condition for the existence of an informative equilibrium is that the probability that the buyer actually wants to acquire the firm $\phi = \phi(y)$ is non-constant. Moreover, if $\phi(y)$ is monotone then it must be decreasing in y.

The proof is in the Appendix. An immediate result of the proposition is that given the seller knows the intention of the buyer, disclosure cannot be informative in equilibrium, the seller would al-

ways deviate from an informative equilibrium strategy. This extends to the case if he is uncertain but the probability ϕ that the buyer wants to acquire the firm is a constant over all values of information y. Thus, to sustain an informative equilibrium, the probability must be influenced by the proprietary information in a rather specific way. More favourable information must make it less likely that the buyer will actually acquire the firm. Formally, the reason lies in the curvature of the profit functions. Any informative equilibrium relies on a subtle trade-off between the different forces at play, and a constant ϕ does not give enough weight to the countervailing forces.

4.2. Illustrative example

Consider again an example that was discussed in the previous section. Assume the probability decreases with y

$$\phi(y) = 0.81 - y/3 \quad (7)$$

An informative equilibrium is the following:

$$Y_1 = [1, 1.3999] \text{ and } Y_2 = (1.3999, 2]$$

(y_1 rounded). As shown in Figure 3, the seller has a strict incentive to disclose Y_1 if and only if $y \leq 1.3999$, and disclose Y_2 otherwise. The buyer is not misled by the disclosure on average. She will revise her expectations after disclosure of Y_1 to $E[y \mid Y_1] = 1.2000$ and after disclosure of Y_2 to $E[y \mid Y_2] = 1.7000$. The probability of the acquisition is $\phi(Y_1) = 0.4100$ and $\phi(Y_2) = 0.2434$. Note that any disclosure which distinguishes between Y_1 and Y_2 must be interpreted similarly. For instance, suppose the seller shows the prospective buyer his internal budget based on information $y = 1.8$; the buyer nevertheless must revise expectations to $E[y \mid Y_2] = 1.7000$.

It should be emphasised that in such an informative equilibrium, there is a flow of information even though there is no verification of the disclosure. It is in the seller's best interest to inform truthfully, but not precisely. Note that there is always an uninformative equilibrium in which no information is disclosed (or if disclosed, is ignored), and the prior expectation with $E[y] = 1.5$ is unchanged. Therefore it is important to see whether there are incentives on either side that an informative equilibrium if existent, is selected. It is even more complicated in cheap talk games to find reasonable conditions that support one equilibrium over the other because there are always infi-

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[12] Other explanations are reputation for truthful information or signalling.

[13] Note that the babbling equilibrium is also a partition equilibrium with a trivial partition.

[14] The inclusion of the boundary values y_i to the sets Y_i or Y_j, $j = i + 1$, is arbitrary.

Figure 3
Disclosure equilibrium for unverifiable information
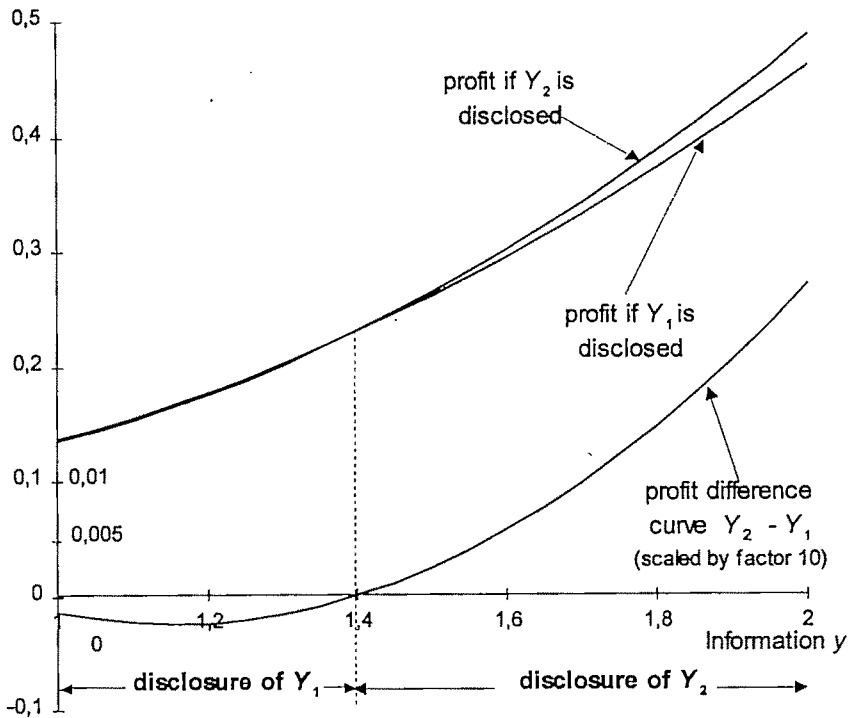
nitely many equilibria even if they are outcome-equivalent to the uninformative equilibrium.

The seller moves first. *Ex ante*, he prefers as little disclosure as possible because his profit function is convex. Thus, he would have an incentive to precommit to the non-disclosure equilibrium. *Ex post*, his preferences depend on the information he possesses. However, it can be shown that the seller always prefers the uninformative equilibrium for all y.[15] The reason is the same as that underlying corollary 1: the expected profit functions are strictly convex, and hence, less disclosure is preferable to the seller. However, this does not necessarily make other equilibria uninteresting.

5. Verification of information
The main result so far has been that the disclosure strategies are very different and, broadly speaking, opposite depending on the quality of the information in the hand of the seller. The quality of information is defined appealing to the verifiability of information: information can only be verifiable or not, by definition there is nothing in between.[16] Verifiability has been assumed to be an unchangeable characteristic of the private information the seller holds.

Depending on the type of information, the seller

might be able to decide on the quality of information. For example, he may have the information audited or approved by a competent third party. To gain some insight into the potential benefits of verification suppose y is information that is known by the seller who then decides whether or not to verify the information. Verification may be costly or not. This option adds another point to the game sequence depicted in Figure 1: before making the disclosure decision the seller decides on the verification of information. If information is disclosed the buyer can observe whether it is verified or unverified information. If information is not disclosed the buyer does not know the verification decision made by the firm.

Verification and disclosure can be considered as simultaneous decisions since they occur before the buyer makes any move. There are four strategies

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[15] Applying the neologism-proof condition by Farrell (1993), the uninformative equilibrium survives exactly because there are no types $y \in Y_i$ that strictly prefer to disclose Y_i to disclosing nothing at all.

[16] There might be some bounds on cheap talk. For instance, a court might be able to state 'large' deviations from the true information, while 'small' deviations cannot be proven. This would translate to a setting in which unverifiability is reduced to a subset of Y. Thus, the results of this paper will essentially go through for each different subset.

available:

{v, d}   verify and disclose verified information
{v, nd}   verify, and do not disclose
{nv, d}   do not verify, and disclose unverified
          information
{nv, nd} do not verify, and do not disclose.

Obviously, the strategy {v, nd} is (weakly) dominated by {nv, nd} since the buyer does not notice a verification undertaken, and, hence, cannot react on it. The next proposition records some general results on the equilibria that evolve.

Proposition 3: (i) Suppose the cost of verification is nil. Then all equilibria are equivalent to the equilibria that occur under verifiable information. In particular, {nv, d} is never an equilibrium strategy.
(ii) Suppose the cost of verification is very 'high'. All equilibria which exist under unverifiable information prevail. {v, d} is never an equilibrium.
(iii) Increasing the cost of verification leads to less disclosure of verified information.

The proof is in the Appendix. Part (i) shows that if verification is costless the seller will always verify information which he intends to disclose. This leaves essentially no room for the disclosure of unverified information in equilibrium. Part (ii) shows that if verification is very costly no verified information will be disclosed in equilibrium. Finally, part (iii) records the well-known fact that a direct verification cost reduces the disclosure of verified information in equilibrium (see Verrecchia 1983).

These results are rather weak. This stems from the fact that comparisons of equilibria are very complex, and more generally, that it is difficult to obtain unambiguous results if the individual results include already multiple equilibria. What can be seen, though, is the fact that equilibria including the disclosure of verified information are generally dominant in the sense that they drive out disclosure of unverified information. Thus, empirically, one should observe disclosure of unverified information mainly in a situation where such information cannot be verified.

6. Summary and conclusions
This paper explores disclosure strategies of a firm which attempts to sell the whole firm or a separate operation to a prospective buyer who is currently a competitor. Equilibrium disclosure strategies are sensitive to the uncertainty about the buyer's intention whether she will acquire the firm or continue to be a competitor in the market. If information is verifiable a high degree of uncertainty reduces the flow of information. The seller discloses less information in equilibrium than in the case where he is relatively certain about the

buyer's intention. Any equilibria with less than full disclosure are characterised by disclosure of 'average' information, if any disclosure occurs; moreover, disclosure of precise information is outcome-equivalent to imprecise disclosure. If information is unverifiable the reverse holds: a high degree of uncertainty may give rise to equilibria that are more informative than in case of relative certainty. Informative equilibria contain imprecise information in the form of convex subsets of the range of possible information, precise disclosure cannot occur in equilibrium.

In order to elicit verifiable information, the buyer must appear determined whether to buy or not; to elicit unverifiable information credibly, the buyer must appear 'inscrutable' to the seller. The reason for both results lies in countervailing incentives the seller faces: while he would want to disclose favourable information if the acquisition occurs, he would want to conceal the same information in case the acquisition fails. For high uncertainty as to what the buyer will actually do, none of these two effects dominates. This prohibits disclosure of very favourable and very unfavourable information if it is verifiable, and allows information to flow truthfully in case it is unverifiable. Finally, if the seller can decide upon verification of information the beliefs of the buyer generally induce verification of the information. As long as the verification costs are not too high the seller thus will aim at verifying information.

These results are derived in a model which is set up so as to capture the major effects of information transmission in an acquisition setting. The trade-off between tractability of the model and the realism of the assumptions requires some compromises with respect to real-world settings in which acquisitions occur. One assumption underlying the model is the consideration of only two firms competing in a duopoly which, if acquisition is successful, turns into a monopoly. Obviously, such an acquisition might violate anti-trust laws in many countries. Extending the model to several competing firms in a product market where the (informed) target firm is to be taken over by one of the other firms, would not have a major effect on the results. The other firms enter as additional uninformed players which would not induce additional strategic issues, but probably affect only the relative magnitude of the profit functions. Not only would the extension to more firms reduce anti-trust concerns, it could also be used to justify another critical assumption in the model, that the seller receives all of the surplus generated by the acquisition. Competition among bidders for the selling firm would tend to drive their acquisition surplus to zero. In fact, empirical results consistently found that target firms' returns over the acquisition period are significantly positive while the bidding

firms' returns are close to zero.[17] Another restriction of the model is that the degree of uncertainty as to the buyer's intention is given exogenously. It might be interesting to enrich the model to include the buyer's choice among alternatives she might face. These could even be imagined to also depend on the market. The complexity added would be enormous, though.

The model is essentially a one-period model, so that timing is not an issue even though the model with verifiable information would lend a simple interpretation to the timing of information: if during negotiations, the uncertainty with respect to the intent of the prospective buyer reduces, more information is disclosed. As another possible extension, it would be interesting to study questions such as the timing of disclosure during the negotiation process.

More formal considerations include the observation that most situations analysed involve multiple equilibria. There is no clear criterion that can be used to eliminate or prefer one or the other equilibrium. This is a general problem of game-theoretic models with incomplete information. While this may reduce the predictive power of the results of such games, their analysis is useful in structuring the thinking about such problems which are certainly relevant to practical decision-making.

Appendix
Proof of Proposition 1
In equilibrium the non-disclosure set is implicitly defined in (6) as

$$N = \left\{ y \mid (4+\phi) \cdot y^2 \le \phi \cdot \left(9E[y^2|N] - 4E[y|N]^2\right) + (1-\phi) \cdot (3y - E[y|N])^2 \right\}$$

Suppose $N = \{1\}$, implying $E[y|N] = 1$ and $E[y^2|N] = 1$. The seller will disclose any information y for which

$$(4+\phi) \cdot y^2 - 5\phi - (1-\phi) \cdot (3y-1)^2 > 0 \quad \text{or}$$

$$5(2\phi-1)y^2 + 6(1-\phi)y - (1+4\phi) > 0 \qquad (A1)$$

(A1) is a quadratic function. By construction, it holds with equality for $y = 1$. The slope is positive at $y = 1$ if $\phi > 2/7$, and then the maximum must be reached at a value $y > 1$. Therefore, it is sufficient to check if the value of (A1) is greater zero for $y = 2$. If this holds then it also holds for any $y \in [1, 2]$. This results in $8\phi > 3$. In this case the seller will disclose any information (possibly except for $y = 1$ where he is indifferent).

Next, suppose $N = \{2\}$ which gives $E[y|N] = 2$ and $E[y^2|N] = 4$. The seller discloses every y for which the following holds:

$$(4+\phi) \cdot y^2 > 20\phi + (1-\phi) \cdot (3y-2)^2 \qquad (A2)$$

Similar reasoning as above gives the sufficient condition $6\phi < 1$ for the existence of a full-disclosure equilibrium. This proves part (i).

Part (ii) follows from the curvature of the two sides of the inequality that defines the non-disclosure set N. Let T define the difference curve between disclosure and non-disclosure in equilibrium,

$$T = (4+\phi) \cdot y^2 - \phi \cdot \left(9E[y^2|N] - 4E[y|N]^2\right) - (1-\phi) \cdot (3y - E[y|N])^2 \quad (A3)$$

$$\frac{\partial T}{\partial y} = y \cdot (-10 + 20\phi) + 6(1-\phi) \cdot E[y|N]$$

$$\frac{\partial^2 T}{\partial y^2} = -10 + 20\phi < 0$$

because by (i), $\phi \le 3/7$. The second derivative is a constant in y which indicates that the first derivative is linear and strictly decreasing. Thus, (A3) describes a strictly concave function. Since a partial-disclosure equilibrium cannot sustain if all values of T are strictly less or strictly greater than zero for all $y \in Y$, the maximum of (A3) must be in the interior of Y. This implies that the non-disclosure interval in equilibrium must be $N = [1, y_1] \cup [y_2, 2]$ with $y_1 < y_2$.

To prove (iii), a non-disclosure equilibrium can only sustain if there is no incentive to disclose any y given $N = Y$. Evaluating T with this results in

$$T = (4+\phi) \cdot y^2 - \phi \cdot \left(9 \cdot \frac{7}{3} - 4 \cdot \frac{3^2}{2}\right) - (1-\phi) \cdot \left(3y - \frac{3}{2}\right)^2 \qquad (A4)$$

$$= (-5 + 10\phi)y^2 + (9 - 9\phi)y - 3(3 + 13\phi)/4$$

To show the existence of a non-disclosure equilibrium, this expression must be less than zero for all $y \in [1, 2]$. This results in conditions for ϕ that sustain such an equilibrium. First, the maximum of T is achieved at

$$y^* = \frac{9 - 9\phi}{10 - 20\phi}$$

Case 1: Suppose the maximum lies at the boundary $y = 1$. This implies $y^* \le 1$. This results in $\phi \le 1/11$. Evaluating T at $y = 1$ shows that for such ϕ this value is always strictly greater than zero. Hence, this cannot support a non-disclosure equilibrium.

Case 2: Suppose the maximum lies at the boundary $y = 2$, which implies $y^* \ge 2$. This results in $\phi \ge 11/31$, and evaluating T at $y = 2$ shows this is again strictly positive.

Case 3: Suppose the maximum lies in the interior of Y. Then T must be evaluated at y^*. Tedious

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[17] See for more recent studies, e.g. Draper and Paudyal (1999), Higson and Elliott (1998).

calculation results in

$$\phi = \frac{89 \pm \sqrt{385}}{314}$$

which is equal to $0.22095 < \phi < 0.34593$ (rounded).

Q.E.D.

Proof of Proposition 2

Since earlier literature has established the fact that any disclosure strategy of an informative equilibrium must be a step function defined on Y, it suffices to prove the existence conditions stated in the proposition.

The non-existence of an informative equilibrium is shown for special two-partition disclosure equilibria,

$$Y = Y_1 \cup Y_2 \text{ where } Y_1 = [1, y_1] \text{ and } Y_2 = (y_1, 2]$$

It extends directly to any finer-partition equilibria since each two adjacent subsets must satisfy the same structural inequalities. The only difference is that finer-partition equilibria require more such conditions, and are satisfied less likely.

The equilibrium conditions for the seller are

$$\phi \cdot \left(9E[y^2|Y_1] - 4E[y|Y_1]^2\right) + (1-\phi) \cdot \left(3y - E[y|Y_1]\right)^2$$

$$\geq \phi \cdot \left(9E[y^2|Y_2] - 4E[y|Y_2]^2\right) + (1-\phi) \cdot \left(3y - E[y|Y_2]\right)^2$$

for all $y \leq y_1$ and   (A5)

$$\phi \cdot \left(9E[y^2|Y_1] - 4E[y|Y_1]^2\right) + (1-\phi) \cdot \left(3y - E[y|Y_1]\right)^2$$

$$\leq \phi \cdot \left(9E[y^2|Y_2] - 4E[y|Y_2]^2\right) + (1-\phi) \cdot \left(3y - E[y|Y_2]\right)^2$$

for all $y \geq y_1$.

Consider certainty with respect to the intention of the prospective buyer. Suppose $\phi = 1$ first. Then (A5) becomes

$$9E[y^2|Y_1] - 4E[y|Y_1]^2 \geq 9E[y^2|Y_2] - 4E[y|Y_2]^2 \quad (A6)$$

Since $Y_1 = [1, y_1]$ and $Y_2 = (y_1, 2]$, this simplifies to

$$3(y_1^2 + y_1 + 1) - (y_1 + 1)^2 \geq 3(4 + 2y_1 + y_1^2) - (2 + y_1)^2 \text{ and}$$

$$y_1 + 2 \geq 2y_1 + 8$$

which is a contradiction. Suppose $\phi = 0$ next. The equilibrium condition becomes

$$\left(3y - E[y|Y_1]\right)^2 \leq \left(3y - E[y|Y_2]\right)^2 \text{ or}$$

$$E[y|Y_1] \geq E[y|Y_2] \text{ for all } y \leq y_1$$

which is again a contradiction. Consequently, there cannot be an informative equilibrium for $\phi = 0$ or $\phi = 1$. Thus, $0 < \phi < 1$ is necessary for existence.

Observe that the functions on both sides of (A5) are quadratic, and hence, continuous and increasing in y. In order to satisfy (A5) the slope of the RHS must be greater than the slope of the LHS. Suppose the contrary: then if the LHS > RHS for any y it must be for high y first. However, this would contradict (A5). Thus, a necessary condition for (A5) to hold is that the slope of the LHS is less than that of the RHS. Taking the first derivatives of both sides of (A5), this is equivalent to

$$(1 - \phi(Y_1))(3y - E[y|Y_1]) < (1 - \phi(Y_2))(3y - E[y|Y_2]) \quad (A7)$$

Since by definition of Y, $E[y|Y_1] < E[y|Y_2]$, it follows that $\phi(Y_1) > \phi(Y_2)$ is necessary for (A7) to hold. If $\phi(y)$ is monotone, then it must be decreasing in y to satisfy (A7). This proves the final assertion of the proposition.

Q.E.D.

Proof of Proposition 3

If the situation is such that there is no informative equilibrium if information is unverifiable then it is clear that $\{nv, d\}$ cannot be an equilibrium. The only equilibrium that would survive is the full non-disclosure equilibrium (babbling). Such an equilibrium requires $N = Y$. If there is a non-disclosure equilibrium under verifiable information (see Proposition 1) then this prevails. Otherwise there is always some information y that is disclosed assuming the seller would hold expectations of $y \in Y$. Since verification is costless the seller always has an incentive to verify and disclose such information. Thus, the equilibria that exist under verifiable information prevail.

Assume next there is an informative equilibrium if information is unverifiable. Any such equilibrium is a partition disclosure equilibrium. Consider a two-partition disclosure equilibrium with $Y_1 = [1, y_1]$ and $Y_2 = (y_1, 2]$. From corollary 1, the seller strictly prefers equilibria with 'less' disclosure. Therefore, if there exists a non-disclosure equilibrium under verifiable information this is undistinguishable to one under unverified information. If there is an equilibrium with disclosure of verified information over some range of y at least the same range of y will be verified and disclosed relative to the alternative of disclosing subsets of Y unverified since the expected profit is higher under N in the verifiable information equilibrium. This proves that any informative equilibrium under unverifiable information cannot sustain. This proves part (i) of the proposition.

Part (ii) considers extremely high verification costs. Then, no verification will be undertaken. Thus, any information is unverified. Thus, all equilibria under unverifiable information continue to exist.

Part (iii) states that increasing the cost of verification leads to less disclosure of verified informa-

tion. This is obvious from the definition of the disclosure and non-disclosure sets, as defined in (6). Inserting a cost reduces the profit of the seller if he verifies and discloses the information while leaving the expected profit of non-disclosure unaffected. This must reduce the set of y which are disclosed. Since verification costs are not incurred for cheap talk, these equilibria are also not affected by verification costs.

Q.E.D.

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The golden age of Raymond John Chambers, professional accountant and university educator 1917 to 1999: a memorial

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'There are a thousand thoughts lying within a man that he does not know till he takes up the pen to write.'
William Makepeace Thakeray (1811–63).

Raymond John Chambers was an Australian thinker and writer throughout the second half of the 20th century. He was born in 1917 shortly before the end of World War One and died months before the dawn of a new millennium. Ray's thoughts and many writings were almost exclusively about the state of accounting practice during that rapidly changing period (Chambers and Dean, 1986). Fortunately, his writings form an intellectual legacy of immeasurable proportions to the accounting world of the 21st century.

Ray's researched contributions to accounting knowledge started shortly after the end of World War Two with a book on financial management (Chambers, 1949) and ended in the year of his death with a review of the writings of Bob Sterling, a fellow philosopher of accounting (Chambers, 1999). Ray's written words are to be found in most of the libraries of the free world, and his oral communications are stored in the minds of countless colleagues and students. He was a remarkable thinker who translated complex arguments about the *idea of accounting* into cogent texts for researchers and teachers.

It is impossible to measure the degree of Ray's intellectual influence over the last half century. It is also difficult to imagine the accounting world without his presence. He was an Australian but, like so many of his countrymen and women, he played on a world stage. Ray's main mission throughout his professional life was to convince accounting policy makers of the need to abandon the ad hoc pragmatism of patching flaws in historical cost accounting. He devoted his entire academic career creating a general theory of accounting and, then, arguing passionately for it. He was a philosopher of science examining the history of an idea used in the practical world of business. As such, his motivation was the improvement of accounting practice through the use of relevant theory.

Ray was a constructionist rather than a deconstructionist, a builder rather than a demolisher. None of these characteristics appear to have been

fully appreciated by the academic community in his lifetime. To some academics, Ray was an eccentric who entertained in the classroom or at the conference. To others, he was a theorist who, by definition, was incapable of creating anything practical. To a smaller number, he was an intellectual giant who helped to change the accounting community's approach to thinking about accounting and its problems (Mathews, 1982). To the large remainder of the accounting community, however, he was and is unknown except, perhaps, as a name listed in a library index.

This is not an unusual experience for a successful academic. It is unusual to find a community that fully appreciates, let alone agrees with, the thoughts of a single person. However, Ray was occasionally deflated by the rejection. He abhorred a practice of accounting that lacked a coherent theory and yet had survived decades of legitimate challenge. He could not understand how intelligent men and women failed to agree with his prescriptions for practice. He wanted so much to see his ideas translated into reform and action. In 1970 he expressed his frustration in the following statement to a conference of accounting practitioners (Chambers, 1970:28):

> 'Financial statements at present are very similar to the pronouncement of the Greek oracles. The deliverances of the oracles, you may remember, were couched in terms which could be interpreted in more ways than one. Whatever course was chosen by those who consulted the oracle, the outcome could be shown after the event to tally with what the oracle said.'

> 'One can scarcely avoid the conclusion that we have advanced little in this respect in over 2,000 years, and, to judge by the mounting criticism, the business community seems to think that is not good enough.'

> 'The fabric of accounting – both its so-called theoretical justifications and its practices – are shot through with fundamental errors.'

If he were alive today, these words of Ray 30 years ago could easily be uttered in an accounting world coping with the aftershocks of British Bank

of Credit and Commerce International, Cendant, Maxwell Communications, Pharmor, and Sunbeam.

In moments of self-doubt, Ray seemed to be unaware that change is often a subtle phenomenon in human affairs. It can happen quietly, when least expected, and the change agent is not necessarily the primary advocate of change. Radical change in a human system as endemic as accounting is rather like a dam that is subject to the pressure of the water it is holding back. A weakness in the dam may at first be small, unnoticed, and insufficient to cause the dam to break. However, over time, the weakness becomes more pronounced until, inevitably, it cannot prevent the flood. Historical cost accounting currently can withstand the pressure of critics such as Ray. After all, it is used throughout the world by corporate and non-corporate organisations in a connected system of economic contracts, exchanges, and taxes that is hard to envisage far less to change. However, no system can remain closed forever. By definition, a completely closed system is dead. Therefore, no matter how slowly and no matter how strong the resistance to change, accounting will change. That is when the accounting theoretic legacy left by Ray will come into its own.

The Chambers legacy

Ray Chambers was born in Newcastle, New South Wales in 1917. Newcastle is an industrial town to the north of Sydney. Little more than one hundred miles to the south of Newcastle, a nine-year-old boy called Donald George Bradman was about to enter the intermediate high school in Bowral. Australia was at war. Forty per cent of its eligible male population was in uniform, and 68% of that force were killed or seriously wounded. The year was 1917 when the US entered the War, when 300,000 British and Commonwealth soldiers were killed in the mud of Passchendale, and the Bolsheviks seized power in Russia. The post-War period in Australia was an uncertain and unstable time. Ray entered the University of Sydney in 1934 as an evening student, working as a clerk in government service and then in industry. He graduated in economics in 1939 and, after further government service with the Australian Prices Commission, became a technical college teacher in 1945. When he started publishing in 1947, the US Marshall Plan to aid Europe was signed, and Britain granted independence to Pakistan and India.

The early Chambers writings are practical works designed to assist accountants in the tasks of financial and cost accounting within the context of business management (see Wells, 1982 for details). They obviously reflect Ray's initial employment experiences in business accounting. In 1949, his background with the Prices Commission resulted in an article on changing price levels (Chambers, 1949). From 1950 onwards, his research focus was primarily on this topic and, at an ever-increasing pace, he moved to a more general overview of the state of accounting theory and practice. He published *Blueprint for a Theory of Accounting* in 1955 (Chambers, 1955), *Toward a General Theory of Accounting* in 1961 (Chambers, 1961), and what most researchers of accounting history regard as his magnum opus, *Accounting, Evaluation and Economic Behavior* in 1966 (Chambers, 1966). Ironically, 1966 was the year when Mao Tse-Tung proclaimed the Cultural Revolution in China and forced the thinkers and writers of that country to the hard graft of the rice field.

The gist of Chambers' major early publications was that a general theory of accounting is a necessary precursor to rational practice. The theory had to reflect the nature of the firm, markets, and management. Accounting is an information and communication system designed to meet the decision needs of managers, investors and others. Accounting information must represent the reality of what is purported to be described, and it requires to be verified by contrasting it with these realities. In other words, accounting is a derivative of its economic environment. Ray's theorising led him to accounting prescriptions based on exit prices as the only proper way of reflecting economic realities in accounting terms. His subsequent work from the 1960s to the 1990s was largely devoted to expanding, reiterating, or revisiting these basic propositions. More than 200 publications evidence this sustained effort, and he received numerous awards and honours for it (especially in the US).

The impact of Chambers

To understand the impact of Ray's writings and speeches, they have to be considered in a historical context of accounting education and practice. When he started his academic career at the University of Sydney in 1953, his appointment was its first full-time position in accounting. It was within the Faculty of Economics. Similar developments were happening in the UK (e.g. with William T. Baxter at the London School of Economics). At that time, the teaching of accounting at university typically was regarded in the non-American world as a matter for part-time lecturers who were full-time practitioners. Research was an almost unknown activity in accounting. In the US, on the other hand, accounting had a longer university tradition as a subset of economics. Accounting professors researched and wrote from the early 1900s onwards, but these publications were closely connected to the practice of accounting based on historical costs (e.g. Paton and Littleton, 1940).

Ray Chambers was therefore starting at the University of Sydney, if not with a blank sheet, then at least with one in which there was room for considerable innovative thinking.

Ray took full advantage of this vacuum in accounting thought in the early to mid-1950s. The gradual movement toward full-time accounting educators in universities considerably assisted his work, and the founding of accounting research journals (of which *Abacus* in 1962 was an important element) encouraged a growing public debate about the state of accounting and financial reporting. Cometh the hour, cometh the man. Ray was not only able to participate in the debates of practitioners (e.g. in the development of mandatory accounting principles in Australia, the UK, and the US) (see Wells, 1982), but was also able to express his theoretical arguments and practical criticisms in the leading research journals of the day (e.g. *The Accounting Review* and *Journal of Accounting Research*). These writings, together with his 1966 text, placed Ray at the pinnacle of the accounting academy by the mid-1960s. He was regarded as one of the finest normative accounting theorists of his time, a remarkable accomplishment for an Australian in a community dominated by US accounting academics.

However, things were to change rapidly in the 1970s and 1980s. These were years in which Ray had to battle on several fronts at the same time. First, the criticisms and problems of accounting practice continued and became more public (e.g. with GEC-AEI and Pergamon Press in the UK). The financial press was observing accounting with a greater expertise than ever before (e.g. in *The Wall Street Journal* in the US and *The Financial Times* in the UK). Accounting academics were becoming more vocal (e.g. Professor Abraham Briloff in the US and Professor Edward Stamp in the UK). Ray was very much part of that critical scene for more than two decades. For example, in the 1970s, he commented at length on specific accounting issues to bodies such as the Australian Select Committee on Securities and Exchange (1971), the Technical Committee of the ICAEW in the UK (1971), the Australian ICAA and ASA (1973), the worldwide IASC (1974), the Australian Mathews Committee on Inflation and Taxation (1975), the Australian Accounting Research Foundation (1976), the UK Inflation Accounting Steering Group (1977), and the US FASB (1979). In other words, having stated his accounting preferences in written theories of the 1950s and 1960s, Ray used them in an attempt to influence the mandatory standardisation of accounting in the 1970s and 1980s.

Second, the accounting academy changed so radically from the late 1960s onwards that it left Ray and many other normative theorists resem-bling dinosaurs shortly before their extinction. Put simply, the change took place in the US at a relatively few universities and involved a relatively few researchers. It constituted a radical move away from 'subjective' normative reasoning to support accounting prescriptions to 'objective scientific' observation of individual and market behaviour (see, e.g., Watts and Zimmerman, 1986). The use of US accounting doctoral programmes to train future researchers (including many Australians) in the new research paradigm, and editorial control of the leading accounting research journals, were the two most obvious resources used in this paradigm shift. This closure continues today, despite reasoned protests from leading theorists such as Robert Sterling (1990) and Ray Chambers (1993). What it meant for Ray was a completely incomprehensible rejection of normative accounting theory by the research community and its replacement by a form of accounting anthropology that avoids the rigours of field studies by use of databases and lab experiments. This flummoxed Ray. From 1971 onwards, he published mainly in *Abacus* and the professional literature.

Chambers in retirement

Following his official retirement in 1982 from the University of Sydney, Ray continued his academic career at a more modest and mainly reflective pace. He continued to research, write and address audiences throughout the world. He wrote of 'the ethical cringe' (Chambers, 1991), the 'positive accounting cult' (Chambers, 1993), and 'historical cost – tale of a false creed' (Chambers, 1994). But perhaps his lasting academic monument will be *An Accounting Thesaurus* (Chambers, 1995) that contains over 6,000 entries on accounting ideas, rules and practices from the English literature of the last 500 years.

Ray received many honours during his professional career. These included the AICPA's gold medal for an outstanding contribution to the literature (1967), the Order of Australia for services to commerce and education (1978), life membership of the AAANZ (1983), the AAA's Outstanding Accounting Educator (1991), admission to the Accounting Hall of Fame (1991), and honorary doctorates from Deakin and Wollongong Universities (1993). These, however, are the explicit signals of Ray's contribution to the history of accounting ideas. The substantial content of that contribution lies on shelves of libraries and in minds of individuals.

The academic and practice communities of accounting owe much to Ray, often in ways of which he was unaware. He was a teacher, colleague, mentor and friend to many individuals. He taught me to think about the idea of accounting – what it meant and what it was intended to do when put into prac-

tice. He therefore instilled in me the need to think freely about accounting – not to be indoctrinated or beguiled by the subtleties of words or the seduction of statistics – but, instead, to explore and understand their meaning and effect. He taught me to argue cogently and with conviction – not as an entertainer but as a responsible professional. He taught me to accept and respond to fierce criticism in a constructive way. He taught me to know what it means to be a professional accountant working in the classroom or the research laboratory. Above all, he taught me to try to be a gentleman in a world increasingly devoid of morals. Whether I learnt all of these lessons to his satisfaction is highly debatable. But that is my fault and not that of Ray. He influenced many others, and his life's work is available to influence future generations of accountants. His body may be gone but the intellect of Raymond John Chambers will remain so long as the accounting barbarians can be kept from the accounting library door.

> 'It is a lesson that all history teaches wise men, to put trust in ideas, and not in circumstances.'
> *Ralph Waldo Emerson (1803–82).*

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Institute Offices and Library:
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ISSN 0001-4788

Accounting and Business Research

Volume 31   Number 2   Spring 2001

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The true and fair view requirement in recent national implementations

Sally Aisbitt and Christopher Nobes*

Abstract—This note examines the implementation of the true and fair view requirement into the laws of Austria, Finland, Norway and Sweden. It builds on an earlier analysis of the 12 EU member states that had previously implemented the requirement. It is found that three of the four countries depart from the wording of the appropriate language versions of the Fourth Directive. Also, two of the countries do not implement the 'override', and the other two implement it in a way not done before, by reserving to the member state the specification of the allowed departures.

1. Introduction

The implementation and impact of the EU Fourth and Seventh Directives' true and fair view (TFV) requirement (as reproduced in Appendix 1) was examined by Nobes (1993) for 12 countries. Since that time, three new member states (Austria, Finland and Sweden) have joined the EU, and the requirement to implement the Directives has been complied with in non-EU members of the European Economic Area[1] (the largest such country being Norway). This note marshalls the facts for these four countries and puts them in the context of the earlier 12 countries. The paper looks first at the signifiers used in the Directives; then at the signifiers in national laws; then at the implementation of the 'override'.

Other researchers may wish to use these facts in order to explain the choices made or to try to assess the extent to which the implementation of the Directives is likely to contribute to the harmonisation of European financial reporting. The variations in interpretation and understanding of TFV within and between countries and over time (e.g. Nobes and Parker, 1991; Nobes, 1993) have demonstrated that this is an area where the process of harmonisation is far from complete.

2. Signifiers in the Directive

Nobes (1993) follows others in distinguishing between the signifier and the signified relating to the TFV, but also notes that the signifiers implemented in member state laws are not the same in all cases as those in the official versions of the Directives. For the four countries studied here, there are three new language versions of the Fourth and Seventh Directives, given that Austria is covered by the earlier German version. Table 1 shows the signifiers equivalent to 'a true and fair view' of Article 2 of the Fourth Directive for these languages. A full table for comparison of all the languages is shown as Appendix 2.

Figure 1 adds the three new language versions to the 10 others in terms of their approximate literal meanings in English. Two interesting points emerge. First, like all the earlier versions except the original[2] English, the Norwegian and Swedish versions use a unitary signifier. In the case of the Swedish version of the Directives,[3] Wennberg (1991) explained that the first drafts were produced by accountants in Sweden, under the guidance of the Justice Department for approval in Brussels. The English version of the Directive was the primary source, but the Danish version (and occasionally the German and French) was used where there were difficulties in interpretation. TFV, perhaps the most difficult requirement to interpret, seems to have been an area where recourse was made to the Danish Directive. On the other hand, the Finnish Directive, with no linguistic relative in previous versions of the Directive seems to have looked to the English and produced a dual signifier.

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The final version of this paper was accepted in November 2000.

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[1] Iceland, Liechtenstein and Norway.

[2] The evidence for this is strong and is reviewed in Nobes (1993).

[3] Wennberg gives particular emphasis to the Eighth Directive.

Figure 1
'True and fair' signifiers in the Fourth Directive

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                              Signifiers
                                  |
        ┌─────────────────────────┴─────────────────────────────────┐
       Dual                                                       Unitary
    ┌────┴────┐              ┌─────────┬──────────┬──────────┬──────────┐
True and   Right        Faithful   Reliable    Picture      Real    Right-
fair view   and          picture    picture   according    picture  looking
          sufficient                           to facts             picture
           picture
   |         |              |          |          |           |        |
English   Finnish        Dutch      Danish     German       Greek   Swedish
                         French    Norwegian    (1978)
                      German (1974)
                         Italian
                        Portuguese
                         Spanish
```
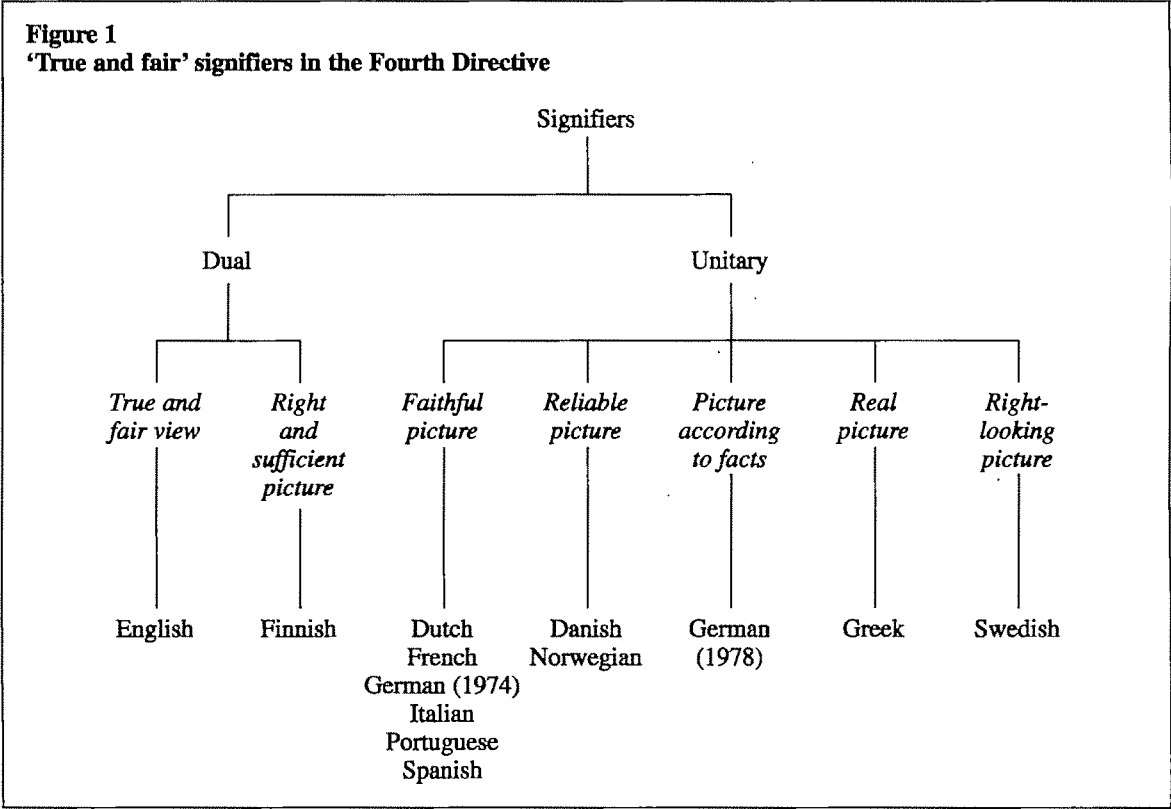
Figure 2
'True and fair' signifiers in national laws

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                              Signifiers
                                  |
        ┌─────────────────────────┴─────────────────────────────┐
       Dual                                                   Unitary
  ┌──────┬────────┬────────┐          ┌────────┬────────┬────────┬────────┐
True and True and True and  Right  Faithful  Good    Picture   Real    Right-
fair view correct appropriate and   picture accoun-  according picture looking
        represen- picture sufficient          ting   to facts          picture
          tation         information         practice
   |        |        |        |        |        |        |        |        |
  UK      Italy   Portugal  Finland  Austria  Norway  Germany  Greece  Denmark
 Ireland                            Belgium                            Sweden
                                     France
                                   Luxembourg
                                   Netherlands
                                     Spain
```

Table 1
Signifiers for a true and fair view (for translations, see Appendix 3)

Country	Words in Directive	Implementation of Directive	Words in law if different from Directive
Austria	ein den tatsächlichen Verhältnissen entsprechendes Bild	1990[1]	ein möglichst getreues Bild
Finland	oikea ja riittävä kuva	1992[2]	oikeat ja riittävät tiedot ... (oikea ja riittävä kuva)
	en rättvisande bild[3]		en riktig och tillräcklig bild .... (rättvisande bild)[4]
Norway	et pålitelig bilde	1998	god regnskapsskikk
Sweden	en rättvisande bild	1995	—

[1] Approximate implementation; full implementation was achieved by the *EU-Ges RÄG* of 28 June 1996, but the relevant section numbers of the ÖHGB did not change.
[2] The expression was incorporated in the Accounting Act 1992, although implementation of the Fourth Directive was not complete until the Accounting Act 1997 became effective. References in this paper are therefore to the 1997 Act.
[3] Swedish is also an official language in Finland, so Finland has two signifiers for the TFV.
[4] The paragraph heading is "Riktiga och tillräckliga uppgifter". In the Finnish version, the heading and the text use identical wording.

The second point is that the Swedish version of the Directive does not use 'faithful' as many versions of the Directive do or the similar 'reliable' as for the Danish[4] and Norwegian Directives, but uses 'right-looking', which is the same as in the Danish implementation as law (see Figure 2 and Appendix 3). Although this may not represent a significant difference, it seems to be further evidence of bureaucratic negotiation over translation as proposed in Nobes (1993), for example in the change of the German version from 1974 to 1978.

3. Signifiers in member state laws

This section deals with the words that have been used to implement the Directives' TFV requirement in national legislation. Nobes (1993) notes that several member states departed substantially or marginally from the words laid out in the Directive. This precedent is continued in three of the new implementations (i.e., except for the Swedish), as summarised on the right of Table 1. Austria departs from the Directive's *'ein den tatsächlichen Verhältnissen entsprechendes Bild'* and substitutes *'ein möglichst getreues Bild'* (ÖHGB § 195 and § 222 (2)), which is much closer to the *'einen getreuen Einblick'* of the German version of the 1974 draft of the Fourth Directive (and the 1976 draft of the Seventh Directive).

Unlike the German law (DHGB § 264 (2)), the Austrian law does not modify the requirement

by adding the words 'in compliance with accepted accounting principles' (*'unter Beachtung der Grundsätze ordnungsmässiger Buchführung'* (GoB)). There is, of course, a requirement to comply with GoB, but as an additional requirement to the TFV, not as a modification of it. However, the above modification *is* to be found in the Austrian instruction on the duties of the auditors (ÖHGB § 274), as it is in the analogous German instructions (DHGB § 322). Its absence from the instructions for Austrian *preparers* may, in practice, not represent a significant difference from German law.

The Nordic countries have a long tradition of the concept of 'good accounting practice' (GAP) (Flower, 1994, p.241–2) which has some similarities to the German GoB. In the same way that the German implementation of the Fourth Directive retained this principle, the Swedish version states, in addition to the TFV requirement:

> Årsredovisningen skall upprättas på ett överskådligt sätt och i enlighet med god redovisningssed. [Annual accounts should be prepared clearly and in accordance with good accounting practice.] (*Årsredovisningslag*, SFS 1995: 1554, ch. 2, para. 2)

Other countries had also continued their former words (e.g. *'régularité et sincérité'* in France, and

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[4] The Danish and Norwegian words can be literally translated as 'reliable', but this may convey the same meaning as the 'faithful' used by Nobes (1993) for Denmark.

'*inzicht*' in the Netherlands) in combination with TFV.

The Norwegian law goes further and implements the TFV concept by using the expression GAP. In complete contrast, Finland has broken away from its previous legislation by omitting references to GAP in the chapter on annual financial statements. Nevertheless, GAP is a requirement in Chapter 1 of the Act, which deals with the obligation to keep accounting records. This is not dissimilar to the Danish approach: GAP was not included in *Årsregnskabsloven* 1981 but persists in *Bogføringsloven* (see Erhvervs– og Selskabsstyrelsen, 1990) and the Stock Exchange's information requirements. The Finnish law paraphrases the wording of the Directive, but the exact phrase from the Directive is included in the law in parentheses:

> Tilinpäätöksen tulee antaa oikeat ja riittävät tiedot kirjanpitovelvollisen toiminnan tuloksesta ja taloudellisesta asemasta (*oikea ja riittävä kuva*). [The accounts shall give right and sufficient information on the reporting entity's result and on its financial position (*right and sufficient picture*).] (*Kirjanpitolaki*, 1336/1997, ch. 3, para. 2, emphasis original)

The explanation accompanying the proposal to the government for the law (RP, 1997, p.15) states that the use of the two expressions is a technical legal device to bring a number of pieces of legislation in line and to demonstrate that the two expressions are synonymous. The expression *oikeat ja riittävät tiedot* was considered to be a translation of the English term, true and fair view, from Article 2(3) of the Fourth Directive. However, the alternative phrase, *oikea ja riittävä kuva*, had already been used in previous legislation (769/1990 and 39/1889).

There may be a danger of making too much of the differences in literal wordings of signifiers. In this context, one notes that, since there are two official languages in Finland, there is an official Swedish language version of the Finnish law. In it, the above sentence uses wording that is closer to the Swedish language version of the Directive:

> Bokslutet skall ge en riktig och tillräcklig bild av resultatet av den bokföringsskyldiges verksamhet och om dennes ekonomiska ställning (*rättvisande bild*). [The accounts shall give a right and sufficient picture of the reporting entity's result and of its economic position (*right-looking picture*)]

Another detail of the wording is that the language versions examined here, except the Finnish, refer to "a" rather than "the" TFV. As noted in Nobes (1993), there are also some exceptions in other languages. However, in the Finnish language, there are no definite or indefinite articles, such concepts being conveyed by word order. This is of little consequence for the Finnish language version of the law because of the reference to "informa-

tion" rather than "picture". The bracketed reference to "right-looking picture" (see in italics above) uses no article even in the Swedish language version of the Finnish law. The decisive clue is that the Swedish language version refers to "*a* right and sufficient picture" in the unbracketed text.

4. The override
As is well known (e.g. Ordelheide, 1990; Otte, 1990), the German implementation of the Fourth Directive does not comply with Article 2(5) which requires departure from the provisions of the Directive 'in exceptional cases' (see text in Appendix 1). The Austrian and Swedish implementations follow this precedent, with no mention of departure or exceptional cases, although departure in exceptional cases had been included in the first draft of the Swedish law (SOU, 1994, ch. 2, para. 2). One could argue that these implementations are examples of member states taking the option of the last sentence of Article 2 (5) (whereby the legislators may prescribe the cases of departure) but specifying no departures. This could be seen as implicit implementation of Article 2 (5).

By the time of the Swedish implementation, no national law had specified any cases of departure and few individual companies had departed from the law (e.g. Van Hulle, 1997; Jönsson Lundmark, 1996). Thorell (1995) argues, in a Swedish context, that a strong interpretation of the override would allow member states to specify departures from a provision of the Directive, which would clearly be unreasonable and would be in contravention of pronouncements from the EC Contact Committee. That Committee (EC, 1990) and Van Hulle (1993) had already supported this interpretation of the Directive. However, Alexander (1993) and Nobes (1993) argue in favour of an interpretation found in the UK whereby the standard-setters have used the override, for example in the context of investment properties and goodwill.[5] The EC Commission (EC, 1997, p.3) has subsequently confirmed that it believes that member states (and presumably standard-setters) are not allowed to promulgate general rules in contradiction of the Directive, but the authority of this statement is ambiguous, and clearly less than that of a Directive.

Contrary to this, the Finnish and Norwegian Acts implement the override using the disputed last sentence of Article 2(5). The Finnish Act specifies that the Ministry of Trade and Industry will decide when and how an entity must depart from the Act in order to give a TFV (*Kirjanpitolaki*,

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[5] SSAP 19 does this by requiring investment properties (which are fixed assets with limited useful lives) not to be depreciated, in contradiction to Article 35(1)(b). Similarly, FRS 10 allows the lack of depreciation of capitalised goodwill.

1336/1997, ch. 3, para. 2). This may amount to a subtle way of arriving at a German, Austrian or Swedish result (i.e., no override) without breaking the letter of the Directive. The Finnish proposal (RP, 1997, p.15) explains that limiting the occasions when the override is permitted is essential to the system of enforcing the law. However, the Finns do not seem to have entirely ruled out the possibility of using the override. There are no examples within the Act, although the proposal (RP, 1997, pp.15–6) included an example about limiting the use of LIFO to certain companies. The override has already been the basis for a ministerial decision (Handels- och industriministeriet, 1998) allowing the use of International Accounting Standards by certain companies in their consolidated financial statements. The preamble to the decision is that:

> Handels- och industriministeriet har *med stöd av 3 kap. 2§2 mom. bokföringslagen den 30 december 1997* (1336'1997) beslutat: ...
>
> [The Ministry of Trade and Industry has decided *with the support of Chapter 3, paragraph 2§2 of the Accounting Act of 30 December 1997* (1336/1997): ...] (emphasis added)

The Norwegian law is the most interesting. The legislators have interpreted the last sentence of Article 2(5) as meaning that the law itself can specify when companies must depart from the Directives. The closest precedent for this is the UK use of standards to specify departures (see above). Early drafts of the Norwegian law included a number of 'exceptions' from the valuation rules, but the final law includes only one clear departure from the Directives:[6] the requirement that marketable investments held as part of a liquid trading portfolio should be marked to market (i.e., held at market value, with gains and losses recognised in the profit and loss account). This requirement is included in the law under the heading of '*spesielle vurderingsregler*' (special[7] valuation rules). The European Commission was already proposing to amend the Directive to allow it (EC, 1998), partly in order to be consistent with requirements of International Accounting Standards (see E 62 of 1998 leading to IAS 39). Norway was merely ahead of developments here and could take comfort from implicit approval of the change by the Commission.

The other issues included under 'special valuation rules' are of a different type in that the Norwegian law interprets or extends the Directives in particular directions, without directly overriding it. These issues are research and development, goodwill,[8] pension costs, leasing, long-term work-in-progress and currency translation. They were also unlikely to be controversial with the Commission, which had issued (EC, 1997) several imaginative[9] interpretations of the Directives

which might be interpreted as suggesting that the Norwegian legislators need not have expressed their rules as departures from the Directive's provisions. For example, the Norwegian law requires the use of the closing rate of exchange for translation of foreign currency monetary balances, which is an issue not explicitly dealt with in the Directive. Most member states[10] accept or require translation at the closing rate, and the Commission (EC, 1997, p.9) regards it as acceptable under the Directives.

The objective of the Norwegian legislation (Ot. Prp., 1988–89) was said to be to move away from the legal formulations of the 1970s and towards internationally accepted practices of the 1990s. Interestingly, the EC Commission now has sympathy for this general approach, as part of supporting the work of the International Accounting Standards Committee (EC, 1995).

A related point is that the Swedish Act allows for work-in-progress to be shown at higher than cost. One could argue that this, too, is supported by the Commission's interpretation, because of its acceptance of the percentage of completion method (EC, 1997, p.8).

5. Summary

The application of the Fourth and Seventh Directives to Austria, Finland, Norway and Sweden involved three new language versions of

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[6] In addition there are instances where the Norwegian Act is more prescriptive than the Directive. For example, Article 35 (3) and (4) of the Directive indicates that indirect costs and interest may be added to production cost, whereas Chapter 5, paragraph 4, amplified by Ot. Prp. (1997–8) implies that these costs must be included for enterprises other than small enterprises. The committee drafting the proposals saw any such narrowing of choice or implementation of Member State options, as well as true derogations, as departures from the Directive, i.e. as a regulated override (NOU, 1995, 2.3.4 Regulert overstyring).

[7] In the proposal from the Accounting Act Committee and the Ministry of Finance, "special valuation rules" were distinguished from "exceptions from valuation rules". The latter comprised the use of market value for financial instruments and the closing rate of exchange. It is unclear why the Parliament merged the two types.

[8] Goodwill on consolidation is not distinguished from other types of goodwill.

[9] For example, the Commission (EC, 1997, p.9) believes that gains on unsettled long-term foreign currency monetary items could be treated as 'made' (Fourth Directive, Article 31(1)(c)). The British law implemented this word as 'realised' (Companies Act 1985, Schedule 4, para. 12 (a)), and SSAP 20 (para. 65) believes that an 'override' is necessary to take such profit into the profit and loss account. Some other member states have an even more restrictive understanding of this provision.

[10] This is required in the UK and Ireland (see footnote 10). It is also the practice in Denmark, France, Greece, the Netherlands, Portugal, Spain and Sweden. (Alexander and Archer, 1995, pp. 133–4, 189, 332–3, 588–9, 685, 853–4 and 1199–2000).

the Directives. The Norwegian and Swedish versions have a unitary signifier; the Finnish a dual signifier. The Norwegian version follows the Danish Directive; the Swedish version follows the Danish law.

Three of the implementations in law depart from the appropriate language versions of the Directive. The Norwegian law retains 'good accounting practice' instead of TFV. The Finnish language version of the Finnish law has 'right and sufficient information', but the Swedish version of the Finnish law is closer to the Directive. The Austrian law departs from the German language Directive but not in order to follow the German law. All the laws refer to "a" rather than "the" TFV.

None of the laws allows directors to use judgment to depart from legal provisions in order to give a TFV. However, the Finnish law allows the government to specify departures, which it has not yet done; and the Norwegian law contains specified departures from the Fourth Directive.

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Appendix 1
English language version of Article 2 of the Fourth Directive

1. The annual accounts shall comprise the balance sheet, the profit and loss account and the notes on the accounts. These documents shall constitute a composite whole.

2. They shall be drawn up clearly and in conformity with the provisions of this Directive.

3. The annual accounts shall give a true and fair view of the company's assets, liabilities, financial position and profit or loss.

4. Where the application of the provisions of this Directive would not be sufficient to give a true and fair view within the meaning of para. 3, additional information must be given.

5. Where in exceptional cases the application of a provision of this Directive is incompatible with the obligation laid down in para. 3, that provision must be departed from in order to give a true and fair view within the meaning of para. 3. Any such departure must be disclosed in the notes on the accounts together with an explanation of the reasons for it and a statement of its effect on the assets, liabilities, financial position and profit or loss. The Member States may define the exceptional cases in question and lay down the relevant special rules.

Appendix 2
Signifiers for a true and fair view

Country	Words in law before Fourth Directive (first appearance)	Words in Directive	Implementation of Directive	Words in law if different from Directive
UK	a true and fair view (1947)	a true and fair view	1981	–
Ireland	a true and fair view (1963)	a true and fair view	1986	–
Netherlands	1. geeft een zodanig inzicht dat een verantwoord oordeel kan worden gevormd ... 2. geeft getrouw en stelselmatig (1970)	een getrouw beeld	1983	1. (as in 1970) 2. geeft getrouw, duidelijk en stelselmatig
Denmark	–	et pålideligt billede	1981	et retvisende billede
France }	–	{une image fidèle,	1983	–
Luxembourg}		{een getrouw beeld	1984	–
Belgium }		{(in Flemish)	1985	–
Germany	–	ein den tatsächlichen Verhältnissen entsprechendes Bild	1985	Unter Beachtung der Grundsätze ordnungs-mässiger Buchführung (then, as Directive)
Greece	–	tin pragmatiki ikona	1986	
Spain	–	una imagen fiel	1989	la imagen fiel ... de conformidad con las disposiciones legales[1]
Portugal	–	uma imagem fiel	1989	uma imagem verdadeira e apropriada (1989 plan)
Italy	–	un quadro fedele	1991	rappresentare in modo veritiero e corretto
Austria	–	ein den tatsächlichen Verhältnissen entsprechendes Bild	1990[2]	ein möglichst getreues Bild
Finland	–	oikea ja riittävä kuva	1992[3]	oikeat ja riittävät tiedot
Norway	–	et pålitelig bilde	1998	god regnskapsskikk
Sweden	–	en rättvisande bild	1995	en rättvisande bild

[1] The words as found in the Código de Commercio (Art. 34).

[2] Approximate implementation.

[3] The expression was incorporated in the Accounting Act 1992, although implementation of the Fourth Directive was not complete until the Accounting Act 1997 became effective. References in this paper are therefore to the 1997 Act.

Appendix 3
Literal translations of words in Table 1 and elsewhere

Netherlands	– geeft een zodanig inzicht dat een verantwoord oordeel kan worden gevormd	presents an insight such that a well-founded opinion can be formed
	– geeft getrouw, duidelijk en stelselmatig	presents faithfully, clearly and consistently (over time)
Denmark	– et pålideligt billede	a reliable picture
	– et retvisende billede	a right-looking (or fair-looking) picture
Germany, Austria	– (unter Beachtung der Grundsätze ordnungsmässiger Buchführung) ein den tatsächlichen Verhältnissen entsprechendes Bild	(in compliance with accepted accounting principles) a picture in accordance with the facts
	– ein möglichst getreues Bild	a picture as faithful as possible
France	– une image fidèle	a faithful picture
Greece	– tin pragmatiki ikona	the real picture
Spain	– una (la) imagen fiel ... (de conformidad con las disposiciones legales)	a (the) faithful picture ... (in conformity with the legal provisions)
Portugal	– uma imagem fiel	a loyal view
	– uma imagem verdadeira e apropriada	a true and appropriate view
Italy	– un quadro fedele	a faithful picture
	– rappresentare in modo veritiero e corretto	represent in a true and correct way
Finland	– oikea ja riittävä kuva	[a?] right (or true) and sufficient picture
	– oikeat ja riittävät tiedot	right (or true) and sufficient information
	– en riktig och tillräcklig bild	a right (or true) and sufficient picture
	– riktiga och tillräckliga uppgifter	right (or true) and sufficient information
Norway	– et pålitelig bilde	a reliable picture
	– god regnskapsskikk	good accounting practice
Sweden	– en rättvisande bild	a right-looking (or fair-looking) picture

Accounting information and analyst stock recommendation decisions: a content analysis approach

Gaétan Breton and Richard J. Taffler*

Abstract—We explore the information set used by sell-side equity analysts in their stock recommendation decisions through content analysis of their company reports. In particular, we assess the relative importance of accounting measures compared with non-financial information items. We conclude that whereas accounting information is of fundamental importance to analysts, it is not the only, nor even the most important, source. Financial analysts are equally concerned with the firm's management and strategy and its trading environment in arriving at their investment recommendations. Our results have implications in terms of enhancing the relevance of financial reporting to key user constituencies.

1. Introduction
Financial analysts play a central role in security markets in interpreting and disseminating corporate financial and other information (Lang and Lundholm, 1996) and their investment recommendations have a material impact on trading activity and stock returns (Womack, 1996; Ryan and Taffler, 2000). Accounting policy makers need to understand how investment analysts, as sophisticated users of financial information and key information intermediaries for investors, actually use financial and other information (Schipper, 1991: 105).

This paper explores the importance of accounting information relative to other, non-financial, information to security analysts in analysing stocks. How much attention do analysts pay to accounting-based numbers compared with more qualitative measures such as quality of management, trading prospects and firm strategy in assessing firm value, and what implications does this have for the financial reporting process?

Specifically, we seek insights into the factors that influence sell-side analyst investment recommendations, their ultimate judgments, through formal content analysis of their company reports. By modelling the analyst recommendation generation process in terms of the information used in discriminating between buy, hold and sell recommendations, we obtain a better understanding of what information is truly decision relevant.

Our results demonstrate that whereas profit-based information is of importance, balance sheet based measures are much less so, if at all. Nonetheless, non-financial qualitative factors are the most significant drivers of analyst judgment; in particular an analysis of corporate management and strategy.

We conclude that further consideration needs to be given to ensuring formal disclosures and appropriate audit of such important non-accounting information to shareholders in the annual report.

The remainder of the paper is arranged as follows. Section 2 reviews earlier work and Section 3 outlines our content analysis methodology. Section 4 discusses our data and pre-sample analysis and this is followed in Section 5 by our results. Our findings and implications for policy are reviewed in Section 6.

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The final version of this paper was accepted in November 2000.

2. Prior research
A number of studies investigate how security analysts process accounting information using experimental methodologies (e.g. Biggs, 1984; Bouwman et al., 1987 and 1995; Mear and Firth, 1987; Breton and Taffler, 1995). Nonetheless, protocol analysis, regression analysis of analyst information cue usage and case study approaches are restricted in their ability to model the real world evaluation situation, being deficient in both context and incentive structure (Schipper, 1991) and generally lack the decision consequences of the ac-

tual task. In addition, the role (and presence) of the researcher may influence the results. These limitations make it difficult to use such approaches to evaluate the real importance of conventional financial reporting and other data in the process of assessing security values.

Questionnaire and interview methods also have their difficulties and are often characterised by inconsistent results (Breton and Taffler, 1995: 88, Table 8). Asking analysts or investors directly about the relative importance of different types of information may provide little real insight into what they use in practice. Direct observation of analysts in their normal work environment is also both time consuming and limited in scope (Gniewosz, 1990).

In contrast, Rogers and Grant (1997: 19) argue that examining the output of analysts in the form of texts of their reports, the end product of their decision process, overcomes the above problems successfully.[1] Previts et al. (1994) investigate the content of sell-side analyst company reports using word-based content analysis methodology. They find that earnings and performance-related discussions dominate the reports, supporting the extensive links between earnings and security prices in the literature, with balance sheet and other accounting-based references far less prevalent.

Of particular relevance is their highlighting of the attention being paid to quality of management and disclosure and evaluation of corporate strategy. Previts et al. conclude (p.66) that '...contemporary financial reporting provides an important but incomplete basis for sell-side analyst forecasts of company performance. Their information needs exceed traditional, transaction-based reports.'

In a study more closely related to our research, Rogers and Grant (1997) content analyse 187 sell-side analyst reports using sentences or clauses as the information unit and code all specific information into six broad thematic categories. They then cross-reference these with the different component parts of the firm's full text annual report to identify potential sources for the information units. The authors find that whereas just over half the information contained in their analyst reports can be found in the annual report, GAAP financial statement information constitutes only a relatively small proportion of the total information cited, with balance sheet and cash flow items rarely mentioned. In total, the narrative sections of the annual report provide almost twice the citations compared with the basic financial statements. Rogers and Grant

(1997: 26) suggest further insights can be derived from exploring the relationship between analyst stock recommendation and information usage.

In parallel with these two studies, we also adopt a content analysis methodology focusing on sell-side analysts' reports. These sources, despite being less timely than other means of brokerage house client communication, are the only extensive trace of the analyst's work.

This trace, being written, also benefits from the process of rationalisation that goes with any such formal articulation process. Because these documents make formal recommendations to investors, e.g., to buy, to hold or to sell, and present the underlying arguments supporting these recommendations, we assume they reflect the essential factors and considerations used by analysts to discriminate between investments of different quality, and their beliefs about stocks' intrinsic values relative to their market values.[2] Barber et al. (1999) show that the average time between sequential recommendations for a firm is around 200 days. This implies that associated reports are written to be self-contained and read independently of earlier reports on the same company, which is the assumption in our analysis.

The methodology of content analysis has been widely used in other areas of accounting. For example, Jones and Shoemaker (1994) reference a corpus of 35 studies, 15 analysing annual reports, eight legal texts, seven letters of comment on exposure drafts, three standards and training manuals and one each government reports and testimonies before commissions.

Abrahamson and Amir (1996), using a word-based content analytic approach focusing exclusively on negative references, conclude that the president's letter has predictive value for the firm's future performance measured in accounting terms. Bryan (1997), in a parallel study, assesses the information content of mandated disclosures in the firm's management discussion and analysis (MD&A) in terms of their incremental value to conventional financial statement-based ratios with disclosure items rated as unfavourable, neutral and favourable. He concludes that MD&A disclosures can assist in assessing firms future short term prospects.

Smith and Taffler (2000), in a UK-based study, similarly adopt content analysis methodology to investigate whether the firm's discretionary narrative disclosures measure its financial risk. Specifically, they find that the chairman's state-

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[1] Schipper (1991: 116) also points out that such difficulties as the lack of explicit incentives and potential conflicts of interest inherent in the work of financial analysts do not arise in the same way with content analysis. This is because there is no eliciting of responses from subjects and the research materials are essentially archival and not experimental.

[2] We note, in addition, other influences on analyst judgments, implicit or explicit, that impact on their recommendations such as underwriting or corporate finance relationships (Lin and McNichols, 1998) and the desire for maintained respect from, and access to, company management, as well as, arguably, peer pressures etc.

ment is highly predictive of firm failure, reinforcing the argument that such unaudited disclosures contain important future-orientated information.

3. Methodology

Academic research tends to focus on analyst earnings forecasts despite these being subsidiary to their main task of making timely stock recommendations (Schipper, 1991; Womack, 1996).[3] We are concerned here to understand the analyst's full information environment, of which such accounting numbers are only a part, and the relative importance of different types of data.

Content analysis methodology is particularly appropriate for our purpose both because of its unobtrusive nature in analysing narratives prepared for other reasons and audiences, and its ability to measure the implicit importance attributed to an information category by the report's author.[4]

Our interest is in the relative importance of the different information types in explaining analyst buy/hold/sell advice.

3.1. Procedure for textual analysis

Our application of content analysis involves the classification of the information units of sell-side analyst reports into common meaning categories, measuring their importance in terms of their frequency of occurrence in the text, and then exploring the relationship between these relative frequencies and analyst stock recommendations via multinomial logistic regression. We infer that the information categories that best discriminate between buy, hold and sell recommendations are those of most value, implicitly or explicitly, to the financial analyst.

Specifically, we work with the underlying themes[5] in texts to detect shades and nuances of meaning and content (Krippendorff, 1980: 63). We focus on the denotative meanings of the narratives, i.e. the sets of information leading to a particular stock recommendation, and the manifest content alone, the presented arguments rather than the hidden feelings or affects of the authors (Smith and Taffler, 2000).

The initial stage of analysis is the development of an appropriate coding structure consisting of an inclusive set of thematic categories qualified by attitudinal indicators (positive, neutral, negative) following the evaluative assertion hypothesis of

Osgood et al. (1956) and Osgood et al. (1957). Clearly, a positive reference to the profit figure is more likely to be associated with a buy recommendation and a negative one with sell advice.

The analytical structure is developed directly from the analysts' reports themselves (Weber, 1990: 37) using a report pre-sample rather than using theoretical constructs imposed by the researcher.[6] Five basic themes are synthesised which, with the three directional arguments, provide 15 thematic textual coding categories.

The main part of the research involves analysing company report narratives by computer[7] and deriving the thematic variables.

Finally, the following statistical analysis is conducted:

(i) separate univariate analyses of the differences in the 15 thematic variable values by report recommendation class (buy/hold/sell); and

(ii) logistic regressions to distinguish between information usage by recommendation (buy/hold/sell).

An important point is that tables in the company reports are not analysed. Strictly speaking, tables are part of the text and contain lexical elements, and their removal requires explanation. The view we take is that the key factor is the argument used by the analyst to justify a stock recommendation and this is expressed in his/her narrative. If information provided in tables and graphs is of true importance in their decision process, then this fact will be referred to explicitly in the text and given prominence through repetition.[8]

4. Data and pre-sample analysis

4.1. Sample selection

Most brokerage houses publish their stock recommendations in monthly summary books. Five of the top six ranked[9] brokerage houses in the City of London participated in this research and allowed us to use their analysts' reports sampled from their summary lists.

Table 1 summarises the distributions of recommendations in the summary books. As can be seen, on average there are 2.5 times as many buy recommendations as sells, and holds are twice as frequent as buys.[10]

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[3] Analysts are not paid merely to forecast earnings but '...to pick stocks and to write reports which cogently support their recommendations.' (Schipper 1991: 116).

[4] Nonetheless, the assumption that frequency of occurrence directly reflects the degree of emphasis accorded to words or themes may not always hold (Weber, 1990: 71–73).

[5] Weber (1990: 37) defines a theme as '... referring to clusters of words with different meanings or connotations that taken together refer to some theme or issue.'

[6] Bryan (1997) is an example of the use of an externally determined framework in his study of MD&A required disclosure information content.

[7] Inter alia to ensure uniformity of coding to our pre-defined categories (Kelle, 1995).

[8] To test the possibility of information loss through table omission explicitly, we conducted parallel analyses on the basis of space occupied by each theme including accounting information presented in tables and without. Results did not differ significantly.

[9] According to the 1990 Extel analyst survey.

Table 1
Summary book recommendation statistics

	No. of stocks covered	Buy %	Hold %	Sell %	Others %*
Mean	434	23	45	9	23
St. dev.	76	1.2	10.3	4.9	15
Max.	533	25	57	14	36
Min.	328	22	33	3	4

* Hold/sell, switch from, switch to, speculative buy, accept offer, reduce, add, hold/buy, strong hold, weak hold, buy for income, hold for income, hold/yield etc.

Monthly recommendation lists used were dated between October 1989 and February 1990 with the exception of one house whose August 1990 book was used.[11] Only about two thirds of the recommendations had an associated report issued.

Reports were randomly sampled by recommendation and brokerage house, according to the following criteria:

(i) the recommendation had an associated recent published report;

(ii) unambiguous buy, hold or sell recommendations;

(iii) a minimum of five reports for each of the three recommendation classes from each house; and

(iv) principally non-financial firms, to ensure a good degree of comparability.

The total sample consists of 105 reports, 37 buy recommendations, 39 holds and 29 sells.[12]

4.2. Pre-sample analysis

Pre-samples are used in content analysis to develop the set of categories to be used in the analysis of the main sample of texts (Bardin, 1977; Krippendorff, 1980). Such samples must come from the same population as the main sample, but can be limited in size. We use a pre-sample to develop our thematic structure.

All sell-side analyst reports are similar in format, with the first page providing a summary of the full document and encapsulating the arguments underpinning the recommendation. We thus focus on this section of the report at the initial stage of the analysis. Sentences are cut into units or segments representing only one idea which can generally be characterised with a simple word or syntagm.[13]

We then synthesise all the derived textual units into five broad mutually exclusive thematic categories on the basis of commonality of meaning, Growth, Management and Strategy, Profitability, Financial Position and Market Conditions.

Such a codification structure, of course, cannot be viewed as objective and will be driven by the familiarity of the researcher with the field (Kelle and Laurie, 1995) and the objectives of the study. Nonetheless, despite the different nature and purposes of the studies of Previts et al. (1994) and Rogers and Grant (1997), our analytical framework can be broadly compared to theirs.

However, such general headings are essential considerations in any analyst's stock valuation process and, as indicated above, need to be refined by directional attributes or qualities, positive, neutral and negative. The derived 15 category predefined analytic structure is then applied to the main sample of full text reports.

4.3. Content analysis of the main sample

All the 105 full text reports were scanned via OCR and the 15 pre-defined thematic categories applied to generate theme variables. Our content analysis is conducted using the computer program SATO (Duchastel et al., 1989) which is specially designed to analyse texts automatically.[14]

Analysis of the main sample is conducted in two stages. First, a keyword dictionary is derived and then, using the KWIC (keyword in context) facility of SATO, all the 105 reports are analysed in detail to provide appropriate thematic assignation.

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[10] Francis and Soffer (1997) find buy recommendations occur four and a half times as frequently as sell recommendations, which they attribute to characteristics of the analyst's work environment that encourage issuance of favourable recommendations. Barber et al. (1999) provide a buy:sell ratio of 7.6:1. Our far lower proportion of buys to sells may reflect the differing institutional environment in the UK, or could be an artefact of the start of the UK economic recession of the early 1990s. However, Ryan and Taffler (2000) provide a similar ratio of new buy recommendations to new sells for the mid-1990s.

[11] This firm had to be sampled later than the others because it was restructuring its research department at the time.

[12] The number of buy recommendations per firm is either seven or eight, the holds vary between seven and nine, and the number of sells is five or six.

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[13] In most cases, the subject of the verb in the textual unit clearly highlights the information item.

[14] This produces frequency statistics not only for words but also for themes, and automatically calculates the theme variables we use as the basis of our statistical analysis.

Table 2
Classification of words to themes

Growth	Growth	Investment
	Addition	Acquisition
	Development	Bid
	Disposal	Merger
Management and Strategy	Management	Leadership
	Productivity	Objective
	Competitive	Control
	Innovative	Restructuring
Profitability	Profit	Results
	Earnings	Returns
	Contribution	Costs
	Margins	Losses
Financial Position	Equity	Debt
	Gearing	Liquidity
	Capital	Share price
	Borrowings	Dividends
Market Conditions	Market	Contracts
	Demand	Products
	Volume	Sales
	Orders	Customers

The specific steps in the analysis are ($^\circ$ denotes using the computer and $^\circledR$ researcher judgment):

(i) an alphabetic sort of all words appearing in the texts together with frequencies;$^\circ$

(ii) identification of all relevant subject nouns (keywords);$^\circledR$

(iii) assignment of these to the five broad themes;$^\circ$

(iv) conduct a KWIC analysis for each report to determine the attribute dimension for each keyword for classification into the full 15 thematic categories;[®,15,16] and then finally,

(v) derivation of the 15 thematic variables for statistical analysis via:

$$\text{thematic variables} = \frac{\text{frequency of thematic category keywords}^{\circ,17}}{\text{total number of words in the text.}}$$

Table 2 provides examples of word classifications to the five basic themes and Table 3 into the 15 refined themes through analysis of context.

4.4. Validation

The employment of multiple coders is the traditional approach to reliability problems in content analysis studies (Morris, 1994). However, this is not appropriate here as the computer program SATO is used to assign keywords to themes automatically.

The area of main concern is the validity of the underlying thematic classification scheme, which depends on the researcher's knowledge and experience of the domain being investigated (Morris, 1994). Two research assistants independently synthesised the word list derived from the pre-sample into analytical categories. The 85% average rate of agreement with our conceptualised analytical structure is very adequate for our purposes.

5. Results

5.1. Company report characteristics

Table 4 provides a breakdown of report length and market capitalisation statistics by recommendation. As can be seen, both sets of distributions are skewed in all cases; there is no statistical evidence of differential report length or firm size by recommendation using the Kruskal-Wallis H-test.[18,19]

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[15] The proportion of keywords in the texts is about 6%.

[16] In the small number of cases of homonyms the researchers had to consider reassigning the subject noun to a different theme to that to which it had been previously classified by computer.

[17] A small number of extreme values (21 out of 1,575) were replaced by the respective firm means.

[18] $\chi^2_{calc} = 0.16$ for report length and 0.34 for market capitalisation ($\chi^2_{0.05} = 5.99$).

[19] Number of words is highly correlated with number of pages ($r = 0.95$).

Table 3
Attribution of qualities

KWIC extracts	*Classification*
These were disappointing **results** (...)	Profitability – negative
Retail **profits** grew (...) in spite of the perceived softness in the DIY **market**	Profitability – positive Market Conditions – negative
Gearing (...) should come down now (...)	Financial Position – positive
(...) recent 4th quarter **figures** were accompanied (...)	Profitability – neutral
Capital expenditure last year was (...)	Growth – neutral
The company's **diversifications** of the past were all unsuccessful (...examples)	Management and Strategy – negative

Table 4
Company report characteristics by recommendation

Recommendation	*n*	*Number of pages*			*Market capitalisation (£m)* *		
		Mean	**Median**	**St.dev.**	**Mean**	**Median**	**St.dev.**
Buy	37	4.2	2.0	3.5	1,165	388	1,972
Hold	39	4.5	2.0	4.5	874	414	1,537
Sell	29	4.1	2.0	3.7	1,112	443	1,834

* The mean and standard deviation figures are derived omitting two cases both with market capitalisation > £10 bn, one Buy and one Hold case.

Table 5
Company report characteristics by brokerage firm

Firm	*n*	*Number of pages*			*Market capitalisation (£m)* *		
		Mean	**Median**	**St.dev.**	**Mean**	**Median**	**St.dev.**
1	19	2.0	2.0	0.0	613	348	990
2	21	4.3	2.0	5.0	1,147	491	1,778
3	22	4.5	4.0	1.8	1,743	567	2,829
4	22	8.1	6.5	4.7	765	273	1,324
5	21	2.0	2.0	0.0	908	561	974

* The mean and standard deviation figures are derived omitting two cases both with market capitalisation > £10 bn, and both from brokerage firm 5.

We may expect different brokerage houses to have different style reports and perhaps follow different firms. Table 5 summarises report length and market capitalisation by brokerage firm. Size of company followed does not differ between houses although length of report does.[20]

However, any potential problems that might arise in the latter case as a result are somewhat ameliorated by our use of thematic variables standardised by length of report. Nonetheless, we cannot discount the possibility that the nature of the analyst's argument will vary across report length.[21]

In our sample, 49% of the reports are triggered by the publication of the firm's interim results, 37% relate to annual results and the remaining 14% (15 reports) to other reasons such as a bid analysis or general company review.[22] Of the

[20] Adopting the Kruskal-Wallis H-test, for size $\chi^2_{calc} = 5.38$ and for report length $\chi^2_{calc} = 67.2$ ($\chi^2_{.05} = 9.49$).

[21] For example, longer reports may be the result of more in-depth analysis or be prepared for a special purpose.

[22] We tested for differences in report content by reason for issuance using the 15 thematic variables and multiple discriminant analysis but were unable to discriminate between the three 'types' of report on this basis. As such we pool all cases for purposes of analysis.

Table 6
Mean theme by variables by recommendation (%)

		Recommendation			
Rank	Theme	Buy	Hold	Sell	All
1	Profitability – neutral	20.2	18.2	19.7	19.4
2	Market Conditions – neutral	16.3	20.5	18.2	18.2
3	Growth – positive	10.8	11.8	10.7	11.1
4	Profitability – positive	11.4	10.6	7.8	10.0
5	Market Conditions – negative**	5.7	7.4	9.2	7.3
6	Profitability – negative	6.0	5.8	8.9	6.7
7	Market Conditions – positive	5.4	6.2	7.3	6.3
8	Financial Position – neutral	5.9	4.0	4.0	4.7
9	Management and Strategy – neutral**	5.2	3.4	2.6	3.8
10	Growth – neutral	4.0	3.1	3.5	3.5
11	Management and Strategy – positive**	4.1	3.3	2.3	3.3
12	Financial Position – negative	2.0	1.9	2.0	1.9
13	Financial Position – positive*	1.1	2.2	1.7	1.8
14	Growth – negative	1.4	1.2	1.7	1.5
15	Management and Strategy – negative	0.5	0.4	0.4	0.5

Key   * Difference significant at the 10% level, Kruskal-Wallis H test
         ** Significant at the 5% level

[Respective χ^2-statistics with p in brackets: 8.6 (.013), 8.2 (.016), 8.8 (.012), 4.8 (.093); there are 2 degrees of freedom.]

latter, four out of five reports are five or more pages long.

5.2. Univariate analysis

Table 6 provides mean thematic variables by recommendation in descending proportion of occurrence. As can be seen, references to Profitability – neutral and Market Conditions – neutral are most frequent, on average accounting for well over a third of all analyst thematic comment (37.6%). The neutral attributes indicate largely descriptive information with no value (good/bad) implications. The only other variable with more than 10% of thematic mentions is Growth – positive.

Overall, the Profitability theme accounts for 35% of references on average, Market Conditions 32% and Growth 16%. The two least frequently mentioned areas are Financial Position – 8.5% and Management and Strategy – 7.5%.[23]

Perhaps, not surprisingly, adverse comment on management (Management and Strategy) is prominent by its absence in most reports (80%) and where there is some such mention this is brief and usually coupled with much more extensive positive discussion. This would be consistent with the wish not to antagonise a principal source of information (Schipper, 1991; Breton and Taffler, 1995).

Interpretation of the firms' balance sheet and cash flow position (Financial Position – positive and Financial Position – negative) is also relatively infrequent, accounting together for only 3.7% of total references and being placed near the foot of Table 6. Neutral mentions (Financial Position – neutral) dominate such comments (4.7%).

Conducting Kruskal-Wallis one-way analysis of variance highlights only three themes statistically significant at better than the 5% level in distinguishing between recommendation types, and one just significant at the 10% level. These themes (with p in brackets) are Management and Strategy – positive (.012), Management and Strategy – neutral (.016), Market Conditions – negative (.013) and Financial Position – positive (.093).

On this basis, sell-side security analysts appear to find non-financial qualitative information relating to the firm's management and its strategy the most important and decision useful source of information in their key investment advisory function. Management issues, even if comparatively infrequently discussed, dominate in analyst argumentation in discriminating between their stock recommendations.

On a univariate basis, a buy recommendation is associated with both more approving and neutral mentions of company management and strategy but fewer references to adverse trading conditions. Sell advice is driven by exactly the converse in each case. Despite the extensive discussion of profitability issues in all analyst reports, this ap-

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[23] Our results broadly parallel the differential proportions of mention of related non-directional themes in Previts et al. (1994) suggesting commonality of analyst concerns and report structure in the two financial markets.

Table 7
Buy/hold/sell multinomial ordinal logit model coefficients

Variable	Hold		Buy	
	Coefficient	*t-stat*	*Coefficient*	*t-stat*
Constant	−1.030	1.77*	−2.312	−3.29***
Profitability − positive	0.077	1.80*	0.110	2.39**
Management and Strategy − positive	0.153	1.44	0.233	2.13**
Management and Strategy − neutral	0.081	0.95	0.222	2.54**

Sell is the reference category.
Model χ^2 = 21.32 ($\chi^{2.01}$ for 6 degrees of freedom = 16.81).
* significant at the 10% level
** significant at the 5% level
*** significant at the 1% level

Table 8
Buy/sell logit model coefficients

Variable	Coefficient	t-stat
Constant	−0.376	−0.54
Profitability − positive	0.096	1.97**
Management and Strategy − positive	0.246	2.35**
Market Conditions − negative	−0.144	−2.29**

Model χ^2 = 17.44 ($\chi^{2.01}$ for 3 degrees of freedom = 11.34).
** significant at the 5% level

pears to have little impact on the nature of their ultimate recommendation considered alone.

5.3. Multivariate analysis

Nonetheless, the way in which an analyst arrives at a stock recommendation is complex and involves weighing up a large number of inter-related factors simultaneously. A multivariate analysis approach is thus likely to provide a more helpful picture of the comparative decision relevance of different information types to the financial analyst and insights into his/her argumentation process.

Table 7 summarises the results of a multinomial ordinal logit analysis to distinguish between the three recommendation types. Our interest is in which information variables, when taken together, best distinguish between buy, hold and sell reports. Likelihood ratio tests for redundant and omitted variables are conducted to determine those themes to be included in the model (Demaris, 1992: 67–68). Sell is treated as the reference category.

Three themes are statistically significant at the 5% level in distinguishing between recommendations in the buy case: Profitability − positive, Management and Strategy − positive and Management and Strategy − neutral. As each has a positive coefficient we infer that the more positive comments on profitability and approving and neu-

tral references to company management, the more likely is a buy recommendation. Whereas a focus on management and strategy may still be the single most important distinguishing characteristic in analyst arguments, in the multivariate case profitability considerations now assume importance.

For hold advice the only significant distinguishing theme from sell (at the 10% level) is Profitability − positive. Table 1 shows how this category predominates across brokerage firms.[24]

Table 8 presents the logit analysis omitting the hold reports. The resulting model substitutes Management and Strategy − neutral with Market Conditions − negative (significant at the 5% level) in distinguishing between buy and sell directly. The greater the reference to the profitability and management themes and the fewer the mentions of adverse market conditions, the more likely is buy as opposed to sell advice.[25]

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[24] If the multinomial ordinal logit is rerun with buy as the reference category then only Management and Strategy − neutral is significant at conventional levels (in this case at 5%) in distinguishing hold from buy advice.

[25] On a univariate basis, the three themes significant in the 3-group Kruskal-Wallis analysis of variance at the 5% level are now significant at better than α = 0.01, and Profitability − positive replaces Financial Position − positive as significant at the 10% level.

6. Discussion, limitations and conclusions

Research to date into the financial analyst company report has been largely restricted to quantification and analysis of content (e.g. Previts et al., 1994; Rogers and Grant, 1997). Whereas this is important in its own right, it is not possible to infer analyst information needs directly from frequency of mention of information items in their reports. The ultimate analyst judgment – what recommendation to make on a stock (Schipper, 1991: 106) needs to be linked with report content to understand what information is decision useful *in reality*.

Although, as Rogers and Grant (1997:26) point out, it is reasonable to assume that analysts prepare reports designed to communicate efficiently and effectively and lack incentives to introduce extraneous information, nonetheless this refers only to their conscious motivations. It is unlikely that analysts have the necessary self-insight into their intuitive judgmental processes to determine the subset of considerations that drive a particular security recommendation (Mear and Firth, 1987).

Analyst reports constitute the formal explanations of their stock recommendations and are not records of their decision processes (Govindarajan, 1980). In fact, we may speculate on whether we will ever be able to understand the nature of these highly complex judgments when they are made in real world contexts and in the presence of real world incentive structures and conflicts of interest (Schipper, 1991: 116).

The approach we adopt here to overcome such problems is to relate information cues derived from content analysis of analyst company reports (our theme variables) to the actual analyst stock recommendations (buy, hold, sell) using a linear modelling approach. *A priori*, the component model (information) variables are those that are decision relevant. Measures that are not significant may be less important or actually redundant.

Considered on a univariate basis, only four themes are significant in distinguishing between the different types of recommendation in our sample of company reports, three concerned with non-financial qualitative information (Management and Strategy – positive and neutral and Market Conditions – negative) and one (the least significant) with Financial Position – positive, predominantly balance sheet based measures. On the other hand, the overall Profitability theme has the greatest volume of mentions in the reports (36.1%).

On a multivariate basis, only three thematic variables are significant in the multinomial ordinal logit model that predicts an analyst's judgment, Management and Strategy – neutral, Profitability – positive and Management and Strategy – positive. The greater the frequency (assumed proportional to importance) of these three types of mention the more likely the derived linear model predicts a buy

recommendation, and the fewer the mentions the higher the probability of sell advice. Good income statement results or expectations now become important in this multivariate framework, although balance sheet considerations no longer are. Nonetheless, management considerations still dominate.

What are the implications of our results for the financial reporting process? Firstly, our results demonstrate that profit numbers and earnings forecasts are not necessarily the most important information items used by analysts in their firm valuation decisions.[26] Secondly, the potential relevance of balance sheet measures may also be being overstated. Finally, and most importantly, non-financial information is crucial, much of which is informal and generated directly by the company (Holland, 1998). Demonstrably, analysts rely crucially on non-financial, soft, qualitative and imprecise information in their primary task of making stock recommendations. Consideration of a firm's management and strategy, although occupying only a small part of an analyst's report, is the key single determinant.[27,28]

As investment analysts are primary users of financial information and key information intermediaries, such conclusions need to be taken into account in accounting policy making and standard setting to enhance the utility and relevance of financial reports to users. In parallel with Rogers and Grant (1997:25), our results suggest that the financial reporting process could be improved by including such additional qualitative types of information; the scope of auditing services would then need to be re-evaluated to monitor these new disclosures.

This study is of an initial nature and is subject to potential limitations. The definition of the variables we use is open to amelioration by a better approach to grouping information units into common themes. However, the more refined the classification the greater the number of themes leading to reduced number of occurrences in each case, and thus lower discriminant potential.

[26] Note that our interest here differs from that of Francis and Soffer (1997) who are concerned with the market reaction to stock recommendations and earnings forecast revisions conditional on each other. Although the authors conclude that neither subsumes the information in the other, their empirical results (Table 3) demonstrate the principal security return driver is the categorical stock recommendation, with the incremental contribution of earnings forecast revisions, albeit statistically significant, quite limited in economic terms.

[27] We may, however, perhaps view management and strategy considerations as implicitly proxying for long-term profit forecasts in narrative form.

[28] Interestingly, Barker (2000) based on direct observation and interview, also argues that financial statement analysis is not a core competence for analysts, in practice, and earnings (and accounting information) play only a limited role in their information environment.

We also assume that each analyst report contains the necessary argumentation associated with the recommendation. In the case of brief reports published in response to results announcements, it is possible that only incremental information is being dealt with.

In addition, we might speculate that a larger sample size or one more homogeneous in terms of industry groups or report trigger could lead to enhanced results, although such a sample would be difficult to obtain because of the many factors that would need to be controlled for.

Finally, as with all content analysis, the assumption of importance of information item being directly proportional to frequency of mention and other related issues may not be fully realistic (Weber, 1990: 70–73). The process of writing even a technical report is far more complex and subtle than this (Ragin, 1995). However, this is a price that has to be paid to obtain a systematic description of textual narrative in all content analysis procedures, and the benefits clearly outweigh the disadvantages.

Nonetheless, our study is able to make an original contribution to the understanding of the importance of different information types to analysts by explicitly relating company report content to the nature of the stock recommendation made. Further work could usefully focus on the information drivers of recommendation changes (Womack, 1996; Francis and Soffer, 1997) and whether there is a difference in brokerage house style across different firms.

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Corporate environments and international transfer pricing: an empirical study of China in a developing economy framework

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Abstract — This paper investigates the international transfer pricing methods adopted by multinational corporations (MNCs) in China and how their choices are affected by their specific corporate attributes in the context of the business environment in China. Empirical test results based on structured interviews indicate that MNCs having a local (Chinese) partner in management tend to adopt market-based transfer pricing methods. The influence of local partners on the choice of transfer pricing methods is modified by the impact of the source of foreign investment, as the analysis reveals that US-sourced MNCs are more likely to use cost-based pricing methods for international transfers. The influences of these two variables on the choice of transfer pricing methods are significant both directly and interactively. There is also some evidence that export-oriented enterprises are more likely to adopt cost-based transfer pricing than those aiming at China's domestic market. By providing empirical evidence on the impact of key corporate attributes on transfer pricing which have not been studied by prior research in the context of a developing economy, this research contributes to a more comprehensive understanding of transfer pricing in developing countries.

1. Introduction

This paper examines the transfer pricing methods adopted by multinational companies (MNCs) in China and how management's choice of transfer pricing methods is influenced by corporate environments. Structured interviews with the management of large foreign investment enterprises (FIEs) in China, namely Sino-foreign joint ventures and wholly foreign-owned enterprises, provide the data for this research. It is generally hypothesised that FIE's corporate attributes have an impact on their choice of transfer pricing methods. The focus of this study is on the corporate attributes that are of particular relevance to MNCs operating in a developing economy environment.

China is selected for this study because of its increasing importance in the international economic community. According to the International Monetary Fund (IMF, 1999a; Dow Jones, 1999),

the average annual growth of China's GDP during the past decade (1990–1999) is 9.2%, about four times the average growth of the G-7 Countries. The growth of China's economy has been characterised by rapid increases in international trade and inflows of foreign investment. China was the second largest recipient of direct foreign investment in the world in 1993–97, and the third largest in 1998, behind the US and UK (IMF, 1999b). With China's pending entrance to the World Trade Organisation, total foreign investment will likely reach US$100 bn per year (*Business Week*, 1999). FIEs play an increasingly important role in the Chinese economy, accounting for, respectively, 55% and 44% of the country's total imports and exports in 1998 (SSB, 1999). As will be discussed later, they are heavily engaged in transactions with their overseas affiliated companies.

This paper studies the choice of market-based or cost-based transfer pricing methods by FIEs with different corporate attributes in China. These two types of transfer pricing methods are different in rationale and orientation. Market-based methods are generally considered more objective and fairer to the parties concerned, whereas cost-based methods provide more flexibility for management to use transfer pricing to achieve its strategic objectives, including minimising global tax payments and circumventing foreign exchange control regulations.

Foreign investments in the form of joint ventures provide a more reliable contracting and direct monitoring of foreign investors' behaviour by the

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The final version of this paper was accepted in December 2000.

Chinese government. The local partners in a joint venture, which are normally state-owned enterprises, are expected to monitor the latitude that foreign investors use in transfer pricing to pursue their corporate strategic objectives. This monitoring effect is modified, however, by the impacts of other corporate attributes on the choice of transfer pricing methods, motivated by incentive contracts, tax, subsidiary autonomy, availability of market prices, foreign exchange control and other political and economic factors exhibited in China's business environment.

The empirical results of this study indicate that FIEs having a local (Chinese) partner in management are more likely to use market-based transfer pricing methods, while FIEs not having a local partner in management are more likely to use cost-based methods. Export-oriented FIEs, relative to non-export-oriented FIEs, tend to use cost-based transfer pricing methods. Compared with FIEs invested by non-US investors, FIEs with a US source of investment are more likely to use cost-based methods. As there is a significant correlation between FIEs aiming at China's domestic market and FIEs having the participation of local partners in management, the multivariate analysis reveals that the local partner's participation in management and source of foreign investment are significant to FIE's choice of transfer pricing methods. The influences of these two variables are significant both directly and interactively. Thus, whether a FIE is likely to use cost-based or market-based methods depends on both local partner's participation and source of investment. The interaction of a local partner's participation and non-US source of foreign investment results in the greatest likelihood of adopting market-based methods.

Research on this topic is important for several reasons. First, given the size of the China market and its eventual impact on Western economies, there is a need for Western investors to be more knowledgeable about China's business environment. This study provides an insight into one important aspect of that business environment. Second, from a managerial perspective, this research provides a valuable reference for MNCs in planning their operations in China. While shaping the corporate attributes appropriate to China's business environment, management should consider their impact on corporate transfer pricing policies as revealed by this study. Third, from a theoretical standpoint, this study provides empirical evidence on the impact of key corporate attributes on transfer pricing in developing countries, which either have not been dealt with by prior research or have been dealt with inconclusively.

The next section describes the research design and methodology. Section 3 presents the profile of the sample data and some overall results. Section 4 provides the results of the statistical testing of hypotheses and Section 5 concludes the paper.

2. Research design and methodology
2.1. Prior empirical research
Empirical research on international transfer pricing has focused on MNCs operating in the US, UK, Japan and other developed countries. These studies examine the transfer pricing methods used (Arpan, 1972; Tang, 1979, 1981, 1993; Yunker, 1983; Mostafa, Sharp and Howard, 1984; Borkowski, 1992, 1997), the importance of environmental variables (Greene and Duerr, 1970; Tang, 1979, 1981, 1993; Al-Eryani, 1987; Borkowski, 1992, 1997; Oyelere, Emmanuel and Forker, 1999), and evidence of income shifting (Jacob, 1996; Oyelere and Emmanuel, 1998).

In contrast, empirical research addressing the environmental factors of international transfer pricing in developing countries is scarce (Kim and Miller, 1979; Lecraw, 1985; Al-Eryani, 1987), and these studies do not deal with China, the largest developing country. Lin, Lefebvre and Kantor (1993) discuss international transfer pricing problems in China, but without empirical evidence. Chan and Chow (1997a) examine empirically how China's tax bureaus implement transfer pricing regulations. Chan and Chow (1997b) also investigate transfer pricing manipulations by FIEs in China using import and export pricing data, and find significant manipulation in certain industries. However, by adopting an aggregated approach, Chan and Chow (1997b) could not examine the significance of organisational characteristics of individual FIEs on their transfer pricing choices. MNCs' operations in developing countries are subject to more economic, political and social risks and restrictions due to the peculiar business environments in these countries. Within a developing country setting, different types of MNCs (i.e. MNCs with different corporate attributes) may choose different transfer pricing methods as they consider different environmental variables being important.

2.2. Transfer pricing methods
The literature has attempted to classify transfer pricing methods into a number of categories. However, in empirical studies, transfer pricing methods are generally grouped into three major categories, namely cost-based, market-based and negotiated. This is because methods advocated in theory, including marginal cost, opportunity cost, and mathematical programming models, are rarely used in practice (Yunker, 1983; Mostafa, Sharp and Howard, 1984; Al-Eryani, 1987; Tang, 1979, 1981, 1993, McAulay and Tomkins, 1992). Cost-based methods typically determine transfer prices by referring to internal production cost data. Cost

can be classified into two subcategories, actual cost and standard cost, with each subdivided into variable cost and full cost. Negotiation may be involved in cost-based methods in determining mark-ups on cost. A distinction is made between transfer pricing basis (i.e. cost- or market-based) and transfer pricing mechanism (i.e. mandated or negotiated) (Shillinglaw, 1977; Eccles, 1985). Eccles (1985) argued that regarding negotiation as a pricing method is a major deficiency in prior studies. Negotiation is an administrative process of determining a transfer price rather than a pricing method, and can be used with either cost- or market-based transfer pricing methods.

Mark-ups on cost can be determined by referring to a desired rate of return or by referring to the prevailing market price of the product transferred. If the company's policy is to determine mark-ups based on a desired rate of return, a rather arbitrary percentage of cost sometimes based on the company's global policy, the method should be classified as a cost-based transfer pricing method. If the mark-ups are tied to a prevailing market price, i.e. the mark-up is designed to approximate the market price of the product transferred, the transfer pricing method should be classified as a market-based method.

Market-based methods are typically based on prices of arm's length transactions to external customers. Transfer prices may be based on either an external comparable price using prices in the open market for comparable products, or an internally generated comparable price using the price for transactions between the company and independent third parties. These prices may be adjusted (discounted) to reflect certain economies on internal transactions, such as savings in selling expenses. In this case, the market price effectively serves as a ceiling, adjusted downward to a transfer price.

As compared with market-based methods, cost-based methods are regarded as easier to manipulate, as they allow flexibility in cost allocation and mark-up determination according to the classic works of Thomas (1971) and Benke and Edwards (1980). The use of cost-based transfer prices aroused a 'welter of arguments' on what is cost, and in many situations, 'cost' determination involves a substantial element of judgment and arbitrariness (McAulay and Tomkins, 1992). In contrast, market-based methods are perceived to be relatively more objective and fairer to both parties of transactions as compared with cost-based methods (Al-Eryani, 1987). Choi, Frost and Meek (1999) also indicate that market-based methods provide a firm with less room for manoeuvring prices for strategic purposes.

2.3. Hypotheses

As analysed by Chan and Chow (1997b), the business environment in China provides a set of mixed inducements to FIEs' decisions on transfer pricing. The government offers generous tax reductions and incentives to FIEs in designated economic zones and open cities, and for export activities, production using advanced technology and re-investment of profits. With extensive tax incentives, China's effective corporate income tax rate is less than 15%, lower than those imposed by most of its major trading partners. This policy provides inducements for FIEs to use transfer pricing to shift profits into China to minimise their global tax liabilities. On the other hand, the foreign exchange control policy implemented by the Chinese government increases the financial risks for reporting profits in China. Capital account transactions involving foreign exchange is regulated and monitored by government agencies. Meanwhile, the Chinese government's preference for a joint venture set-up provides an inducement for foreign investors to shift profits outwards to reduce profits accruing to joint venture partners. Reporting low profits or losses by FIEs facilitates foreign investors' strategic plays to buy out the local partners' equity stake at favourable prices or to increase foreign investors' equity share by injecting new capital to the FIEs. Given these mixed inducements, FIEs have to formulate transfer pricing policies to accommodate the conflicting strategic objectives. The trade-off of these strategic objectives depends on the specific corporate attributes of the FIEs operating in China's business environment.

2.3.1. Form of investment

The form of investment in the host country has been considered in the literature as one of the factors affecting transfer pricing decisions. Empirical studies rank the interests of local partners as an important variable in transfer pricing decisions, particularly in developing countries (Kim and Miller, 1979; Al-Eryani, 1987). Chan and Chow (1997a) provide empirical evidence that lack of Chinese partner's participation in management is a major reason for initiating tax audits by tax bureaus on international transfer pricing. Chan and Mo (2000) show that the form of investment affects tax evasion during tax holidays.

The formation of a FIE in China needs to be approved by a number of government agencies which monitor the operations of FIEs. A foreign investor has to submit a feasibility study report endorsed by a certified public accountant, which provides information about, inter alia, target markets, export proportion, equipment and infrastructure, foreign exchange requirements and sources, and projected profitability of the proposed FIEs. The government explicitly requires certain FIEs to promote export activities, introduce advanced technology and generate foreign exchange revenue.

Figure 1
A principal-agent model of FIEs in China
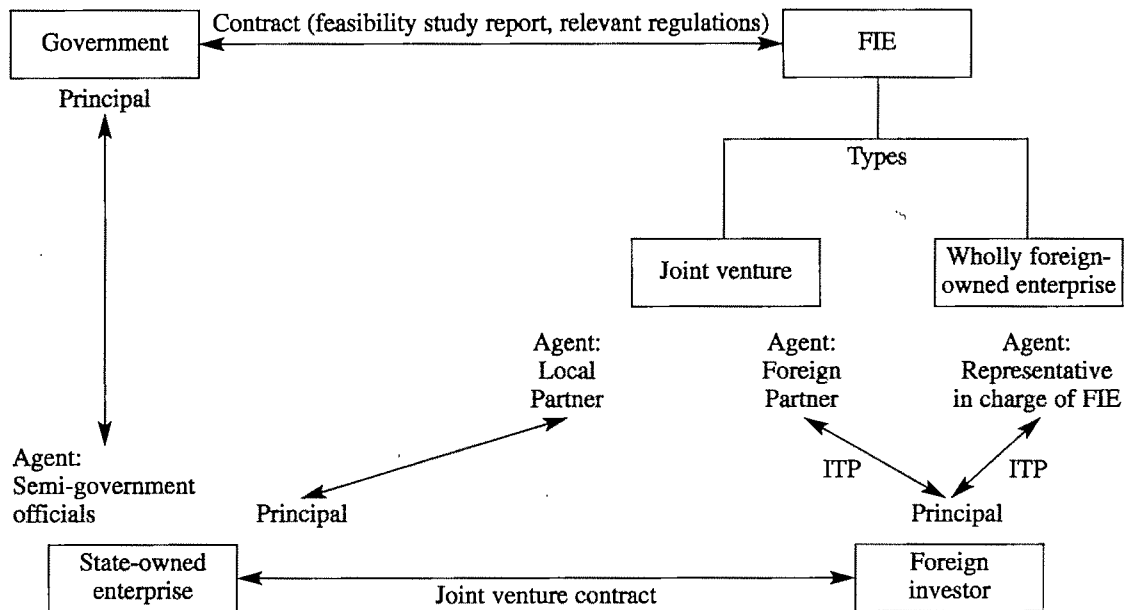
Note: ITP denotes International Transfer Pricing

All FIEs are required to achieve at least a balance between their foreign exchange revenue and expenditure according to China's foreign exchange control regulations. The feasibility study report becomes a basis for various government agencies for evaluating and monitoring the FIE's operations. For joint ventures, a joint venture contract signed by a foreign investor and a state-owned enterprise (local partner) should be approved and registered with the government. This contractual framework of a FIE constitutes a number of principal-agent relationships as shown in Figure 1.

The foreign investors, while establishing business operations in China, aim to penetrate into the domestic market, exploit government tax incentives, protect their proprietary technology, minimise financial risks and maximise their share of profits in case of joint venture with local partners. Some of these objectives are not compatible with those of government policies.

FIEs are required to report their operating results to government agencies for various monitoring purposes. As executives from the foreign headquarter or regional quarters take up key functional roles in the FIEs, the foreign investors have an information advantage over the government agencies about the FIE's operations, and may intend not to diffuse relevant information to the government agencies. The Chinese government prefers joint ventures to wholly foreign-owned sub-

sidiaries, as joint ventures with state-owned enterprises as local partners, in general, provide a more reliable framework for direct monitoring, and therefore reduced information asymmetries. The introduction of local partners in FIEs as a control mechanism is expected to reduce the loss resulting from the divergence of the actions of foreign investors from their contractual obligations, including a loss of revenue due to outward income shifting by the FIEs. To a state enterprise, the success of its investment in a joint venture affects the promotion prospects and the compensation of its executives. These executives are expected to monitor the transfer pricing decisions of the joint venture to safeguard their legitimate share of profits.

Information asymmetry is nonetheless present in a joint venture set-up. The local partner has an information advantage over the foreign investors about costs of materials and components sourced locally. On the other hand, the foreign investors are better informed of the costs of imported materials and components, especially those from their related companies. Given the arbitrariness of cost determination and allocation which leads to a variety of approaches to determining what cost should be, cost-based methods increase the monitoring costs and conflicts between local and foreign partners. In a transfer pricing setting, a gain by foreign partners is often at the expense of the local partners, and vice versa. It has been well-documented

Table 1
Empirical studies comparing international transfer pricing methods used by multinationals

	Tang (1979, 1981)				Borkowski (1997)		Benvignati (1985)	Borkowski (1992)
	Canada	UK	Japan	US	Japan	US	US	US
Cost-based method	33%	34%	41%	47%	18%	46%	72%	52%
Non-cost-based method	67%	66%	59%	54%	82%	54%	28%	48%

in the agency literature that optimal contracting and monitoring reduce the conflict and bring the conflicting objectives of the contracting parties into equilibrium (Jensen and Meckling, 1976). We hypothesise that the participation of a local partner in the management of a joint venture leads to the adoption of a transfer pricing method, which reduces monitoring costs and information asymmetry, promotes fairness between partners, and minimises conflicts over transfer pricing practice. Therefore, it is more likely that joint ventures use market-based transfer pricing methods, which are regarded as more objective, fairer to both parties and subject to less manipulations.

The following hypothesis is formulated:

Hypothesis 1: *FIEs having a local partner in management are more likely to use market-based transfer pricing methods, while FIEs not having a local partner in management are more likely to use cost-based methods.*

The effect of local partners on FIEs' transfer pricing decisions interacts with a number of other corporate attributes likely to have a significant impact on the choice of transfer pricing methods in China within a developing country environment. These attributes include source of foreign investment, orientation of a FIE's activity and the level of production technology. The development of subsequent hypotheses explains that the impacts of these attributes on the choice of transfer pricing are due to motivations for income shifting, subsidiary's autonomy in management, availability of market prices, avoidance of foreign exchange control and other economic and political factors exhibited in China's environment.

2.3.2. Source of foreign investment

Firms with different nationalities may have different corporate philosophies and management styles (Lall, 1979). Arpan (1972) observes that the nationalities of parent companies exert the major influence on international transfer pricing practices. He found that non-US transfer pricing systems are generally more market-oriented than American systems. Two surveys (Ireland, 1991; Firth, 1996)

deal specifically with Sino-foreign joint ventures. Ireland (1991) finds that the extent to which these joint ventures have adopted formalised procedures for decision-making varies with the nationality of the foreign partner. US partners have, on the whole, made a greater effort to export their management approach to Sino-foreign joint ventures, while the Japanese are more cautious about imposing their own management techniques on their Chinese joint venture partners. European ventures in China adopt a mixed management approach whereby foreign and Chinese management styles are blended. These observations are consistent with Firth (1996), which, while not specifically addressing transfer pricing issues, finds that the nationality of the foreign partner is a significant factor affecting the choice of management accounting techniques in Sino-foreign joint ventures. US joint venture partners, compared with their counterparts from Japan and Hong Kong, are more insistent on implementing management accounting systems that match those of their home operations.

The survey by BIC (1982) reveals that, overall, non-US MNCs tend to place greater emphasis on local autonomy than do their US counterparts. Yunker (1983) concludes that market-based transfer pricing is positively related to subsidiary autonomy. Greater subsidiary autonomy explains why non-US transfer pricing systems are generally more market-oriented than American systems as found in prior studies. Tang (1979) found that US MNCs perceive the interest of local partner being less important than Japanese MNCs. A comparison of prior empirical studies as shown in Table 1 reveals that, as compared with Canadian, British and Japanese MNCs, a greater proportion of US MNCs adopts cost-based methods for international transfers. We thus hypothesise that US FIEs are more insistent on imposing their home-country policies of transfer pricing, which as revealed by prior studies are more cost-oriented as compared with those adopted by non-US companies.

The following hypothesis is formulated:

Hypothesis 2: *FIEs with a US source of investment are more likely to use cost-based methods as compared with FIEs with a non-US source of investment.*

2.3.3. Activity orientation

As in other developing countries, FIEs in China are encouraged to carry out export-oriented activities. Given the welcoming attitude towards export-oriented FIEs, tax authorities tend to be more lenient in auditing these FIEs. Compared with other FIEs, export-oriented FIEs also have a more significant volume of inter-affiliate trade. This, as indicated by Jacob (1996), provides opportunities and greater incentives for tax-motivated income shifting through the use of transfer prices. Non-exported oriented FIEs on the other hand generally perceive the interest of local partners and maintaining good relationships with local government being important environmental variables in choosing an international transfer pricing method, as they rely on the local distribution network. FIEs with different orientations of activities should thus adopt different transfer pricing policies. There have been no prior studies examining the impact of activity orientation on transfer pricing. We hypothesise that, with a greater volume of inter-affiliate trade and a lesser degree of reliance on local partners compared with domestic-market-oriented FIEs, export-oriented FIEs have more incentives and are more predisposed to use cost-based methods.

The following hypothesis is proposed:

Hypothesis 3: *Export-oriented FIEs are more likely to use cost-based transfer pricing methods, relative to non-export-oriented FIEs.*

2.3.4. Production technology

It has been argued that one of the main factors which MNCs consider in transfer pricing decisions is the technology content of their products (Lall, 1979). Advanced technology is often the most important factor for product differentiation. Therefore, the more advanced the level of technology embodied in a product, the more likely it is that comparable market prices do not exist.

As in other developing countries, attracting advanced technology has been the priority of China's open-door economic policy. Advanced technology is defined in China's 'Foreign Investment Guidance Industrial Catalogue' (Zheng, 1998). It includes advanced production techniques and equipment producing newly developed products or products in short supply in China. Preferential tax policies are offered for FIEs with advanced technology, including a reduced income tax rate of 15%, and tax exemption for the first two profit-making years followed by a 50% tax reduction for a prolonged period of six years. These provide incentives for high-tech FIEs to exploit tax differentials between China and their home countries. However, as these FIEs usually utilise imported production facilities of advanced technology, they are more adversely affected by China's foreign exchange control policy.

These incentives and challenges provide a greater motivation for FIEs to manoeuvre transfer prices for strategic purposes. We hypothesise that, with generous tax incentives, more stringent foreign exchange requirements, and the more likely absence of market prices, FIEs with advanced technology are more predisposed to use cost-based methods.

The following hypothesis is proposed:

Hypothesis 4: *FIEs with advanced technology are more likely to use cost-based transfer pricing methods.*

2.3.5. Control variables – industry and size

Findings in prior studies on the relationship between industry and transfer pricing methods have not been conclusive (Borkowski, 1996). Some studies on developing countries provide empirical evidence of transfer pricing manipulations in certain specific industrial sectors (Lall, 1973; Vaitsos, 1974; Rahman and Scapens, 1986). The study of Chan and Chow (1997b) reveals that FIEs in China in certain industries, including audio/video equipment, garment and textile, plastic products and chemicals, tend to over-price their imports and under-price their exports. Also different observations about the impact of a firm's size on transfer pricing are found in the literature. Arpan (1972) and Robbins and Stobaugh (1973) find that large firms tend to do the most manoeuvring of liquid assets and adopt sophisticated cost-oriented systems. It is, however, argued that the operations of large firms are more visible to government authorities and subject to a greater scrutiny by government in tax audits (Benvignati, 1985). To control for the potential effects due to industry and size, these variables are incorporated in the statistical analysis as control variables.

2.4. Data collection

2.4.1. Interview methodology

This study adopts a structured interview methodology to obtain the data for testing the research hypotheses. As international transfer pricing is a sensitive and complex topic, an interview survey utilising a network of local contacts can elicit more reliable information than a questionnaire survey. Also, as the objectives of the survey can be explained to the interviewees in detail at the beginning of the interviews, and the identity of the investigator is known to them, this approach alleviates their concern about the potential misuse of survey data. Interview survey also has the advantage of flexibility in terms of adapting and explaining the questions as the interview proceeds. This is particularly useful for questions asking the interviewees to elaborate on their chosen transfer pricing methods. In a society like China, which has a culture of conservatism and secrecy in informa-

tion disclosure (Chow, Chau and Gray, 1995), data collection based on structured interviews utilising a network of local contacts can produce much more reliable and insightful results than surveys using questionnaires sent to unknown managers. These local relationships enhance the truthfulness of the responses and allow follow-up contacts with the interviewees for clarifications of their response after the interviews.

2.4.2. Interview process and the contents of interview questionnaire

To conduct an interview, a local professor or a CPA firm manager first helped arrange the visit to the FIE based on his or her local connections. This local person also accompanied us (the interviewers) to the interview and helped take notes during the interview. This help allowed us to concentrate on the interview and be more alert to any inconsistency in the interviewees' answers and any hesitation in their answering of our questions. After the interview, we compared our notes with those taken by our assistant (the local person) for accuracy and consistency. We followed up on the interviewees on any ambiguity or inconsistency in their answers.

The interview started with our explanation of the nature of academic research and assurance of the confidentiality of the information. We agreed to provide the interviewees with a summary report of our data analysis upon request. The interviewees were mostly controllers and, in a few cases, general managers. Almost always, they were accompanied by an assistant to help answer some technical questions and, when necessary, to look up some information on the spot. As the questionnaire deals with company's policies and facts, rather than personal opinions, no difference between a response from a controller and a response from a general manager was expected or detected.

Next, we explained the specific objectives of this research. The interviewees were then asked to elaborate on their dominant pricing methods adopted for inter-affiliate transfers of goods and materials. This is Section 1 of the interview questionnaire. We explained to the interviewees all the terms on transfer pricing methods as defined in the subsection 'Transfer pricing methods'. If a company has both import and export trade with their affiliated companies, we asked interviewees to elaborate on the transfer pricing methods for both inwards and outwards inter-affiliate trade. Where different transfer pricing methods were used for imports and exports, the dominant transfer pricing method was determined by reference to the dollar value transferred. If a cost-plus transfer pricing method was used, the interviewees were asked about the company's costing systems, and how the mark-ups were determined. Interviewees were asked to elaborate on whether internal or external

comparable market prices were available, and whether 'savings' were used to discount the market prices to internal transfer prices. These elaborations were used to code the FIE's choice of transfer pricing methods. Because the interviews were conducted in a friendly atmosphere (as opposed to a mailed questionnaire sent to unknown managers), we had ample opportunities to explain the questions and asked the interviewees for clarifications of their answers. During the interview, we also noticed that a number of US multinationals adopted corporate worldwide transfer pricing methods, and these observations were recorded. In asking questions, we were careful not to influence the interviewee's response by giving our opinions.

Section 2 of the interview questionnaire asked about the corporate and business environment, including the form of investment, source of foreign capital, foreign equity share, local partners' participation in management, tax privilege, status of advanced technology, industry, size of operations, activity orientation, and nature and volume of inter-affiliate transactions. These questions were asked after Section 1 of the questionnaire in order to avoid our potential subjective bias to interviewees' answers in Section 1 of the questionnaire arising from our prior knowledge of the FIE's corporate attributes. Questions about the volume and proportion of import and export trade with affiliated companies also serve as a crosscheck of the data collected in Section 1 for determining the dominant transfer pricing method. Questions about inter-affiliate transactions other than goods and materials, although not directly used for the hypotheses testing of the study, were asked in order to gain a more complete understanding of the transfer pricing issues in the FIEs. These questions included inter-affiliate transfer of machinery and equipment, technology and trademark, and provision of management services and loans.

In most cases, immediately after interviews, the interviewees arranged for us a plant visit and sometimes a business lunch with their staff. They showed us the production process, and explained to us the sourcing of raw materials and the distribution of products. These field visits and lunches further enhanced our knowledge about their operations, and provided further opportunities for us to verify the data we collected.

After the interview, we search the relevant business directories which provided information about the FIEs we visited. This information which included, inter alia, the nationality of foreign investors, and the form, industry, size and products of our sample FIEs, was used as a crosscheck of our interview data. The interviewees were called upon to clarify any discrepancy.

After the analysis of interview survey data, we conducted additional interviews with four partners

Table 2
Profile of sample FIEs

Panel (A) Form of investment

	EJV*	CJV*	WFOE*	Total
No. of sample FIEs	49	4	11	64
% of total sample FIEs	77%	6%	17%	100%

*EJV: equity joint venture; CJV: cooperative joint venture, WFOE: wholly foreign-owned enterprises.

Panel (B) Source of investment

	USA	Japan	Europe	Others	Total
No. of sample FIEs	22	15	14	13	64
% of total sample FIEs	34%	23%	22%	21%	100%

Panel (C) Activity orientation

	Export-oriented	Non exported-oriented	Total
No. of sample FIEs	17	47	64
% of total sample FIEs	27%	73%	100%

Panel (D) Production technology

	Advanced technology	Others	Total
No. of sample FIEs	21	43	64
% of total sample FIEs	33%	67%	100%

Panel (E) Industry

	Audio/video equipment, garment and textile, plastic products and chemicals	Others	Total
No. of sample FIEs	16	48	64
% of total sample FIEs	25%	75%	100%

Panel (F) Size: Total assets

	Large (US$20m or more in total assets)#	Small (Less than US$20m in total assets)#	Total
No. of sample FIEs	41	23	64
% of total sample FIEs	64%	36%	100%

The average total assets of the top 500 FIEs in the population amounts to US$20m.

in two large accounting firms in Hong Kong, who have had years of experience with their clients in China business operations. The purposes of these interviews were to verify whether our descriptions of China's business environment were accurate, whether our hypotheses were logical, and whether our data collection procedure was appropriate and the results of our analysis were sensible according to their experience. These interviews provided a further confirmation of the reliability of the data collected and the partners concurred that the findings were compatible with their experience in China.

2.4.3. Administration of the survey

The interview survey was carried out in the major cities of China where FIEs are concentrated. These include Shenzhen, Guangzhou, Xiamen, Shanghai, Beijing and industrial cities in the Pearl River Delta in Guangdong Province. The sample was first selected from the Directory of *The*

Top (Largest) 500 Industrial Foreign Investment Enterprises in China (MOFTEC, 1993). The Directory is similar to the Fortune 500 in the US, except that it is for industrial enterprises in China with foreign investment. A total of 70 FIEs which have used international transfer pricing agreed to grant interviews, of which 64 provided useable responses and are included in the final sample for analysis. Six cases were discarded because the interviewees apologised for leaving in the middle of the interview because of some urgent corporate matters. Their designees, normally their assistants, were unable to answer our questions comprehensively.

3. Research results

3.1. Profile of the sample companies

As shown in Table 2(A), the sample consists of equity joint ventures, cooperative joint ventures and wholly foreign-owned enterprises, representing, respectively, 77%, 6% and 17% of FIEs in the

sample. Unlike equity joint ventures, cooperative joint ventures in China operate according to more flexible and looser-form of contractual arrangements. Local partners in all equity joint ventures in the sample participate in the board of directors. In two cooperative joint ventures where management contracts grant the foreign partners full responsibility for running the venture, local partners' participation in management is lacking. The sample includes FIEs with investors from the US, Japan, and Europe, including UK, Germany, Sweden, France, Norway, and Switzerland. US companies account for the greatest proportion in the sample, followed by Japanese and European companies (Table 2B). No joint venture has multiple foreign partners.

As shown in Table 2C, 27% of the sample FIEs have total exports representing 70% or more of total sales (domestic sales plus exports). These FIEs were designated by the Chinese government as export-oriented. An analysis of our data indicates that export-oriented FIEs have a much greater volume of trade with their overseas affiliates as compared with non-export-oriented FIEs. This reveals that the activity orientation of FIEs reflects to a great extent the volume of inter-affiliate international transfers. About one-third of the sample FIEs were designated by the Chinese government as advanced technology FIEs (Table 2D). The sample consists of FIEs engaged in a variety of manufacturing activities. About a quarter of the sample FIEs are in the industries investigated by Chan and Chow (1997b), i.e. audio/video equipment, garment and textile, plastic products and chemicals (Table 2E). The average annual sales and total assets of the sample FIEs exceed, respectively, US$69 m. and US$53 m. A significant proportion of the sample is the large FIEs in China with total assets exceeding the mean of the population of top 500 FIEs in China (Table 2F).

3.2. Transfer pricing methods used by sample FIEs

Fifty-nine percent of the sample firms (38 FIEs) used market-based pricing, and 41% (26 FIEs) of the sample firms used cost-based pricing. Among the subcategories, the most popular international transfer pricing method used is the adjusted market price method (44% of the sample firms), which is based on market prices with a downside adjustment reflecting the difference between the nature of an internal transfer and the external transaction. Other commonly used methods are the standard full production cost plus mark-up (25% of the sample firms), market price (15% of the sample firms) and actual full production cost plus mark-up methods (14% of the sample firms). Only one FIE in the sample used the re-sale price method, which is classified as a market-based method as it determines transfer prices by referring to the ultimate selling prices to unrelated parties. No FIEs used

profit split or comparable profit methods. FIEs indicated that the cost-plus method using a mark-up to achieve a rate of return comparable to the industry average return is quite acceptable to tax authorities.

A number of FIEs (nine in our sample) adopted the parent company's worldwide transfer pricing methods. All these FIEs were invested by U.S. multinationals, which adopted cost-plus transfer pricing methods and imposed it on their worldwide subsidiaries. The major reasons for using worldwide cost-plus transfer pricing are to cultivate a cost control consciousness in world-wide operations and to use a worldwide consistent mark-up as a fair policy in measuring subsidiaries' performance. Consistent with prior studies, none of the sample FIEs used variable cost, marginal cost, and mathematical-programming shadow price methods.

Of the sample FIEs, 33% have either imports or exports (but not both) with their overseas affiliated companies. Sixty-seven percent of the sample FIEs have both import and export trade with their affiliates, and a majority of these companies used the same transfer pricing methods for both inward and outward flows of goods and materials (Table 3A). For FIEs which used different methods for imports and exports (including two export-oriented FIEs), the dominant transfer pricing methods were identified by reference to the value of transfers (Table 3B). A majority of FIEs (86% of the sample) indicate that market prices for comparable products are available, and about one-third (17 FIEs) 'of these companies adopted cost-based methods (Table 3C).

An analysis was made to see whether transfer pricing of physical goods is related to royalty payments and inter-affiliate loans. As shown in Table 3D, more than 60% of the sample FIEs paid royalties for technology transfers to their overseas affiliated companies, mostly based on a certain percentage of sales. The percentage of royalty payment has to be approved by the Chinese government. While a greater proportion of FIEs adopting market-based transfer pricing methods make royalty payments, the chi-square test ($\chi = 1.22$, df = 1) does not indicate a significant difference in the choice of transfer pricing methods between FIEs which paid for royalty and technology transfer and FIEs which did not make such payments.

Fourteen percent of our sample FIEs have raised loans from their overseas parent companies, and these FIEs paid interest at market rates on these loans, except two FIEs which paid prime rate. The ratio of loans from affiliates to total equity exceeds 50% in only one of these FIEs (Table 3E). In most of the sample FIEs (83% of the sample), the foreign investors hold at least 50% of total equity. This indicates that financing through intra-group loans is not a common practice in FIEs, and thin

Table 3
Transfer pricing methods and inter-affiliate transactions

Panel (A) Transfer pricing methods adopted by sample FIEs

Transfer pricing methods		No. of FIEs
FIEs having only imports from affiliates:		**Total**
Cost-base method	6 (9%)	
Market-based method	13 (20%)	19 (29%)
FIEs having only exports to affiliates:		
Cost-based method	1 (2%)	
Market-based method	1 (2%)	2 (4%)
FIEs having both imports and export trade with affiliates		
Cost-based method for both imports and exports	13 (20%)	
Market-based method for both imports and exports	22 (34%)	
Different methods for imports and exports (See Panel B)	8 (13%)	43 (67%)
		64 (100%)

Panel (B) FIEs using different methods for imports and exports

FIE No.	Imports Value (US$m)	Transfer pricing method	Exports Value (US$m)	Transfer pricing method	Dominant pricing method
1	117	Market price	14	Full cost plus	Market-based
2	26	Market price	13	Full cost plus	Market-based
3	5	Full cost plus	2	Market price	Cost-based
4	6	Full cost plus	1	Market price	Cost-based
5	6	Market price	41	Full cost plus	Cost-based
6	17	Market price	60	Full cost plus	Cost-based
7	12	Market price	91	Full cost plus	Cost-based
8	2	Market price	10	Full cost plus	Cost-based

Panel (C) Availability of market prices and transfer pricing methods

	No. of FIEs	Transfer pricing methods Cost-based	Market-based
Comparable market prices available	55 (86%)	17	38
Comparable market prices not available	9 (14%)	9	0
	64 (100%)	26	38

Panel (D) Royalty payments and transfer pricing methods

	No. of FIEs	Transfer pricing methods Cost-based	Market-based
Having royalty payment	42 (66%)	15 (58%)	27 (71%)
No royalty payment	22 (34%)	11 (42%)	11 (29%)
	64 (100%)	26 (100%)	38 (100%)

Panel (E) Loans from affiliated companies

Loans from affiliates/total equity	No. of FIEs
Over 50%	1 (2%)
26% – 50%	4 (6%)
1% – 25%	4 (6%)
Nil	55 (86%)
	64 (100%)

capitalisation is unlikely to be a substitute mechanism for diverting profits out of China. Most FIEs raised loans from local banks. One explanation is because of foreign exchange control and risks. Interest on loans denominated in foreign currency has to be paid in foreign currency, and so do loans in foreign currencies. This increases the foreign currency burden and risk for the FIEs.

Table 4
Chi-square tests of differences in transfer pricing methods used by FIEs with different corporate attributes

Hypothesis	Transfer pricing methods used			Test results	
	Corporate attributes	Cost-based methods	Market-based methods	Chi-square value	p value
Form of Investment	No. of FIEs with local partner in management	16	35	8.91	0.01**
	No. of FIEs without local partner in management	10	3		
Source of Foreign Investment	No. of US FIEs	12	10	2.70	0.10*
	No. of Non-US FIEs	14	28		
Activity Orientation	No. of export-oriented FIEs	10	7	3.18	0.08*
	No. of non-export-oriented FIEs	16	31		
Status of Production Technology	No. of high-tech FIEs	6	15	1.89	0.17
	No. of non-high-tech FIEs	20	23		
Size	No. of large FIEs	18	23	0.51	0.48
	No. of small FIEs	8	15		
Industry	Audio/video equipment, garment and textile, plastic products and chemicals	9	7	2.52	0.15
	Other industries	17	31		

** Significant at the 5% level; * Significant at the 10% level

4. Statistical testing of research hypotheses

4.1. Chi-square tests

The hypothesised impacts of the four corporate attributes and two control variables were analysed individually and simultaneously. The chi-square tests were first performed to test the research hypotheses individually to examine the differences in transfer pricing methods used by FIEs with different corporate attributes. Table 4 shows that one corporate attribute, i.e., the form of investment is significant at the 5% level, and two corporate attributes, i.e. the source of investment and activity orientation, are significant at the 10% level. The control variables are not significant. These results indicate that there is a significant difference in the choice of transfer pricing methods between FIEs with a local (Chinese) partner in management and those without, between US-sourced FIEs and other FIEs, and between export-oriented FIEs and those aiming at China's domestic market.

4.2. Logistic regression analysis

A correlation matrix of these corporate attributes (Table 5A) reveals modest correlation between

form of investment and activity orientation (r = 0.40, p = 0.01). This indicates that FIEs aiming at China's domestic market are more likely to have the participation of local partners in management. Many FIEs in China choose to organise as an equity joint venture to utilise the local partner's distribution network to develop the local market (Balch, 1996).

To further investigate the corporate attributes associated with the choice of transfer pricing methods in a multivariate setting, we estimate the following equation:

$$TP = \alpha_0 + \alpha_1 \, Form + \alpha_2 \, Source + \alpha_3$$
$$Activity + \alpha_4 \, Tech + \alpha_5 \, Ind + \alpha_6 \, Size + \epsilon \quad (1)$$

where:

TP = Dummy variable assuming the value of 0 if cost-based methods are used, and 1 if market-based methods are used.

Form = Dummy variable assuming the value of 0 for not having participation of local partners in management, and 1 otherwise.

Source = Dummy variable assuming the value

Table 5
Correlation of corporate attributes and logistic regression analysis of their significance to the choice of transfer pricing methods

Panel (A): Correlation matrix of the corporate attributes

Corporate Attributes	Form of Investment	Source of Investment	Activity Orientation	Production Technology	Industry	Size
Form of investment	1.000	0.125	0.400**	0.187	0.067	0.188
Source of investment		1.000	0.286*	0.125	0.038	0.006
Activity orientation			1.000	0.270*	0.061	0.139
Production technology				1.000	0.173	0.038
Industry					1.000	0.094
Size						1.000

**Significant at 1% level; *Significant at 5% level

Panel (B: Logistic regression analysis of the significance of corporate attributes

Corporate attributes		Predicted Sign	Logistic Regression Analysis		
Event = market-based methods			Coefficient	Chi-square	p-value
	Model			17.432	0.01**
Form of investment	(0: FIEs not having local partners in management; 1: other FIEs)	+	1.812	4.062	0.04**
Source of investment	(0: US FIEs; 1: other FIEs)	+	1.131	2.820	0.09*
Activity orientation	(0: export-oriented FIEs; 1:other FIEs)	+	0.976	1.598	0.21
Production technology	(0: high-tech FIEs; 1: other FIEs)	+	−0.390	0.340	0.56
Industry (0: specific industries; 1 other industries)		+/−	0.969	1.797	0.18
Size (0: large FIEs; 1:other FIEs)		+/−	1.099	1.456	0.1

** Significant at the 5% level; * Significant at the 10% level

Note 1: The logistic regression model is as follows:
Z = α_0 + α_1 form of investment + α_2 source of investment + α_3 activity orientation
    + α_4 production technology + α_5 Industry + α_6 Size + ε
where:
Z: model score of logistic distribution
α_i: model coefficient for independent variables (i.e. corporate attributes and control variables)

Note 2: Based on the logistic regression function, 50% of FIEs using cost-based methods and 89% of FIEs using market-based methods are correctly classified, indicating a good fit for the model.

of 0 for US-sourced investment, and 1 otherwise.

Activity = Dummy variable assuming the value of 0 for export-oriented FIEs, and 1 otherwise.

Tech = Dummy variable assuming the value of 0 for high-tech FIEs, and 1 otherwise.

Ind = Control variable for industry, assuming the value of 0 for audio/video equipment, garment and textile, plastic products and chemical industries, and 1 otherwise.

Size = Control variable for size assuming the value of 0 for large FIEs, and 1 otherwise.

As the dependent variable in the equation is binomial, we estimate the equation using logistic regression (Norusis, 1999). The results of logistic regression confirm that form of investment and source of investment are significant corporate attributes to the choice of transfer pricing methods (Table 5B). The signs (+/−) of the coefficients are consistent with the hypotheses. The results indicate that FIEs with a local (Chinese) partner in management tend to use market-based transfer pricing methods, and FIEs with a US source of investment are more likely to use cost-based methods. Activity orientation is not significant in the logistic regression analysis, due to the significant correlation between activity orientation and local partner's participation that the effect of activity orientation is mostly captured by local partner's participation in the multivariate analysis.

4.3. Loglinear model

We further examine the interactive effects of the two variables found to be significant in the logistic

regression analysis, i.e. form of investment and source of investment, on FIE's choice of transfer pricing methods. Using a loglinear model, it is possible to study the direct as well as the interactive effects of these variables on the choice of transfer pricing methods (Norusis, 1999). In addition, the effects can be quantified in terms of odds (probability) of FIEs using cost-based or market-based methods. Given the categorical nature of the data, a loglinear model is appropriate for this purpose. In our analysis, the transfer pricing method is the dependent variable while form of investment and source of investment are the independent variables. The following notation is used for the loglinear test:

Notation	Representation
M	Transfer pricing method
P	Local partner's participation (form of investment)
S	Source of foreign investment
$\lambda_{m(i)}$	Constant parameter corresponding to variable 'transfer pricing method' at level i, $i=0$ (cost-based method), 1 (market-based method)
$\lambda_{p(j)}$	Direct effect parameter corresponding to variable 'form of investment' at level j, $j=0$ (without local partner's participation), 1 (having local partner's participation).
$\lambda_{s(k)}$	Direct effect parameter corresponding to variable 'source of foreign investment' at level k, $k=0$ (US), 1 (non-US)
$\lambda_{mp(i,j)}$	Two-factor interactive effect parameter corresponding to variables 'transfer pricing method' and 'form of investment' at level i and j respectively
$\lambda_{ms(i,k)}$	Two-factor interactive effect parameter corresponding to variables 'transfer pricing method' and 'source of investment' at level i and k respectively
$\lambda_{mps(i,j,k)}$	Three-factor interactive effect parameter corresponding to variables 'transfer pricing method', 'form of investment' and 'source of investment' at level i, j and k respectively

The first step is to determine a good-fitting parsimonious loglinear model. The goodness-of-fit test statistics show that the hypothesis that the three-factor interactive parameter ($\lambda_{mps(i,j,k)}$) is zero should be rejected at the 5% significance level. This indicates that, in addition to the main effect of form of investment and source of investment, there is a significant interactive effect of these two variables on the choice of transfer pric-

ing methods. Thus, a good-fitting parsimonious model is provided as follows (Norusis, 1999):

$$\text{Ln } F_{ijk} = \lambda_{m(i)} + \lambda_{p(j)} + \lambda_{s(k)} + \lambda_{mp(i,j)} + \lambda_{ms(i,k)} + \lambda_{mps(i,j,k)} \qquad (2)$$

where F_{ijk} represents the number of observations in the cell of ijk.

Table 6A shows the estimated λ terms for the good-fitting parsimonious model.

Based on the good-fitting model as shown in (2), the odds of 'cost-based methods' to 'market-based methods' is calculated as below (Norusis, 1999):

$$\text{Ln } (F_{0,jk} / F_{1,jk}) = \text{Ln } F_{0,jk} - \text{Ln } F_{1,jk}$$
$$= \lambda_{m(0)} + \lambda_{p(j)} + \lambda_{s(k)} + \lambda_{mp(0,j)} + \lambda_{ms(0,k)} + \lambda_{mps(0,j,k)} - [\lambda_{m(1)} + \lambda_{p(j)} + \lambda_{s(k)} + \lambda_{mp(1,j)} + \lambda_{ms(1,k)} + \lambda_{mps(1,j,k)}]$$
$$= (\lambda_{m(0)} - \lambda_{m(1)}) + (\lambda_{mp(0,j)} - \lambda_{mp(1,j)}) + (\lambda_{ms(0,k)} - \lambda_{ms(1,k)}) + (\lambda_{mps(0,j,k)} - \lambda_{mps(1,j,k)}) \qquad (3)$$

Based on (3) and the value of the λ terms as shown in Table 6A, the odds of 'cost-based methods' to 'market-based methods' can be calculated for different combinations of the two investigated variables, i.e. $j = 0$ or 1 and $k = 0$ or 1. The overall influences of the direct and interactive effects can be measured by the estimated proportion of 'cost-based' and 'market-based' methods in the various cells of the cross-tabulation according to form of investment and source of investment. The results are presented in Table 6B. The direct effects of form of investment and source of investment are modified (i.e. adjusted) by their interactions. US companies without a local partner's participation are more likely to use cost-based methods as compared with those with local partner's participation. Non-US companies with local partner's participation are more likely to use market-based methods than those without local partner's participation.

We further examine the sub-categories of our sample FIEs in Table 6B, and find that all non-US-without-participation FIEs are export oriented. This indicates that non-US FIEs without local partner's participation are likely to use cost-based methods. These results suggest that activity orientation might have an interactive effect with participation and source of investment on the choice of transfer pricing methods. However, due to the limitation of sample size, we are unable to perform a loglinear analysis to examine the interaction effects of these three variables on the choice of transfer pricing methods.

5. Conclusion

As reiterated by Luft and Libby (1997), 'the problem of explaining firms' choice of transfer pricing is notoriously difficult'. This is especially true in

Table 6
Loglinear model

Panel (A): Estimated λ terms for the loglinear model

Variables		λ Term	Value
Transfer pricing methods	Cost-based	$\lambda_{m(0)}$	0.110
	Market-based	$\lambda_{m(1)}$	−0.110
Transfer pricing methods	**Participation**		
Cost-based	Without participation	$\lambda_{mp\,(0,0)}$	0.404
	With participation	$\lambda_{mp\,(0,1)}$	−0.404
Market-based	Without participation	$\lambda_{mp\,(1,0)}$	−0.404
	With participation	$\lambda_{mp\,(1,1)}$	0.404
Transfer pricing method	**Source of investment**		
Cost-based	US	$\lambda_{ms\,(0;0)}$	0.037
	Non-US	$\lambda_{ms\,(0,1)}$	−0.037
Market-based	US	$\lambda_{ms\,(1,0)}$	−0.037
	Non-US	$\lambda_{ms\,(1,1)}$	0.037
Transfer pricing methods /Participation	**Source of investment**		
Cost-based/without participation	US	$\lambda_{mps\,(0,0,0)}$	−0.257
	Non-US	$\lambda_{mps\,(0,0,1)}$	0.257
Cost-based/with participation	US	$\lambda_{mps\,(0,1,0)}$	0.257
	Non-US	$\lambda_{mps\,(0,1,1)}$	−0.257
Market-based/without participation	US	$\lambda_{mps\,(1,0,0)}$	0.257
	Non-US	$\lambda_{mps\,(1,0,1)}$	−0.257
Market-based/with participation	US	$\lambda_{mps\,(1,1,0)}$	−0.257
	Non-US	$\lambda_{mps\,(1,1,1)}$	0.257

Panel (B) : Estimated proportion of FIEs adopting a particular transfer pricing method

Variables		Transfer Pricing Method	
Source of investment	*Participation*	*Cost-based*	*Market-based*
US	With participation	50%	50%
US	Without participation	64.3%	35.7%
Non-US	With participation	23.6%	76.4%
Non-US	Without participation	81.2%	18.8%

Note: For example, the proportion of the cell " US * Without participation * Cost-based", i.e. i= 0, j = 0, and k=0, is determined using equation (3) as follows:

$$\text{Ln} \,(F_{0,0,0} / F_{1,0,0}) = (\lambda_{m(0)} - \lambda_{m(1)}) + (\lambda_{mp(0,0)} - \lambda_{mp(1,0)}) + (\lambda_{ms(0,0)} - \lambda_{ms(1,0)}) + (\lambda_{mps(0,0,0)} - \lambda_{mps(1,0,0)})$$

$$= (0.110{+}0.110) + (0.404{+}0.404) + (0.037{+}0.037) + (-0.257{-}0.257)$$

$$= 0.588$$

$F_{0,0,0} / F_{1,0,0} = e^{0.588} = 1.80$, $F_{0,0,0} + F_{1,0,0} = 1$

$F_{0,0,0} = 64.3\%$; $F_{1,0,0} = 35.7\%$.

an international setting. This study explains the impacts of corporate environments that are of particular relevance to developing countries on the choice of transfer pricing methods.

This study reveals that FIEs having local partners' participation in management tend to use market-based transfer pricing methods while FIEs not having local partners' participation in management tend to use cost-based transfer pricing methods. The analysis also shows that two other corporate attributes, i.e. source of investment and activity orientation, are significant to the choice of transfer pricing methods when analysed separately. Multivariate analysis reveals that the form and the source of foreign investment are significant to FIE's choice of transfer pricing methods. The influence of these two variables are felt both directly and interactively. Thus, the likelihood of adopting cost-based or market-based transfer pricing methods depends on both local partner's participation in the management and the source of foreign investment of a FIE. Figure 2 depicts

Figure 2
The influence of corporate attributes on the choice of transfer pricing methods
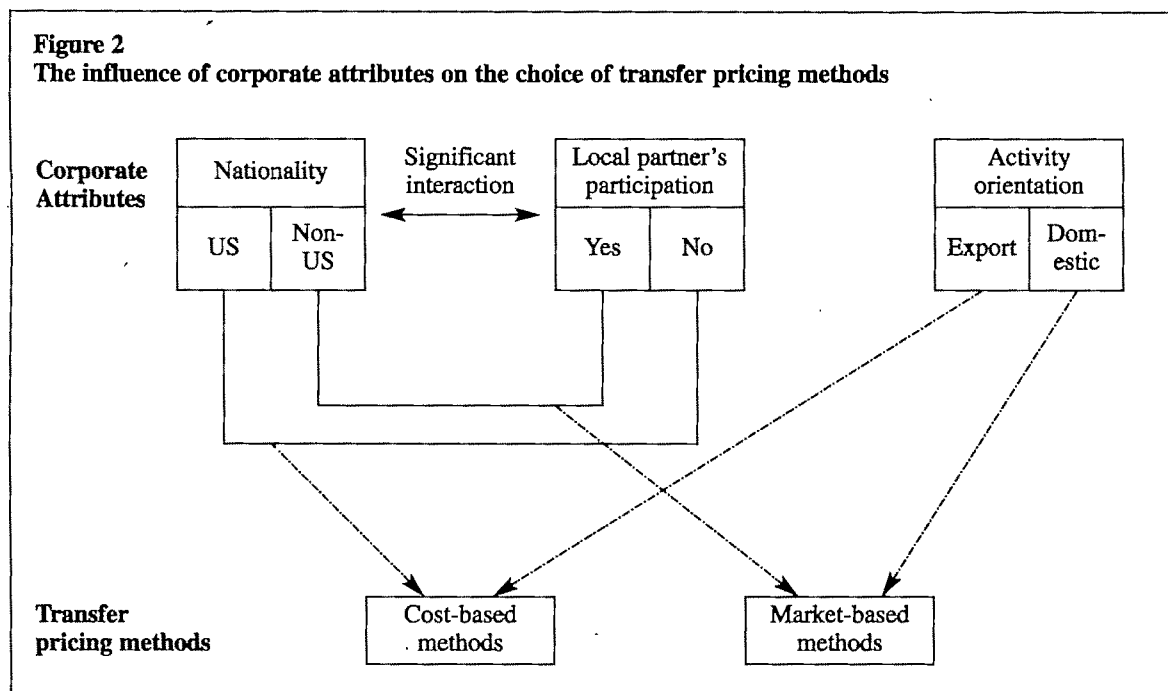
the influence of these variables on the choice of transfer pricing methods.

Many developing countries impose joint venture requirements on foreign investment. Some also focus efforts on attracting investments from targeted sources for both economic and political reasons. Thus, the findings of this study are of particular relevance to developing countries in formulating their policies and regulations on international transfer pricing and foreign investments. Management of MNCs can use these findings as a reference for planning their transfer pricing policies in developing countries. By providing empirical evidence on the impact of key corporate attributes on transfer pricing which have not been dealt with by prior research in a developing economy context, this research contributes to a more comprehensive understanding of transfer pricing in these economies.

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The effect of sequential information releases on trading volume and price behaviour

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Abstract – This paper examines a two-period setting in which each trader receives a private signal, possibly different, in each period before he trades. The principal objectives are threefold. First, we describe the risky asset demands and price reactions in a noisy rational expectations equilibrium where the time 1 average private signal is not revealed by the price sequence but the time 2 average private signal is. Secondly, we analyse how informed trading volume is affected by the revealed information and supply shocks when pure noise trading volume is uncorrelated with observable market variables. Our result indicates that no trade occurs for informed traders when net supply remains fixed across rounds of trade. And, when supply shocks are random, trading volume is induced by the informed and the noise traders, but noise trading is not predictable. Finally, we investigate these properties in the case when pure noise trading volume is correlated with observable market variables. It is shown that no informed trading takes place when there is no supply shock. However, when net supply contains random shocks, trading volume consists of noise and informed trading, both of which can be estimated.

1. Introduction

In the framework of rational expectations models, most papers focus more on price change. But price change, as Beaver (1968) points out, reflects the average change in traders' beliefs attributable to the public disclosure, whereas trading volume reflects traders' idiosyncratic reactions. We examine how the revelation of information influences the price change as well as the trading behaviour of market participants in a multiperiod setting. According to the literature on noisy rational expectations, an exogenous supply shock prevents price from fully revealing the average private signal in a one-period model. Grossman and Stiglitz (1980), and Verrecchia (1982) provide a one-trading-date model with private information acquisition prior to trade. Information acquisition in our paper is similar to these articles, but we discuss two rounds of trade, and a costly signal is acquired by some investors privately prior to trade in both rounds.

Some recent papers, Demski and Feltham (1994), McNichols and Trueman (1994), Kim and Verrecchia (1991b), and Grundy and McNichols (1989), are based on a two-period (three-date) noisy rational expectations model with endogenous private information acquisition and trading at time 1, a public information release and trading at time 2, and consumption at time 3. Our paper examines a different setting adapted from Brown and Jennings (1989). Brown and Jennings assume that traders' times 1 and 2 signals are private and uncorrelated. They show that technical analysis has value in a two-period model in which traders have rational expectations about the relation between signals and prices. However, they do not consider how information revealed by the price sequence affects trading volume.

In our model, we assume that just prior to the opening of the market at times 1 and 2, each trader receives a private signal regarding the accounting earnings of the time 3.[1] This implies that traders begin with homogeneous beliefs about the forthcoming accounting earnings and then receive private signals that cause their beliefs to diverge. The two private signals, at two different dates, have uncorrelated (or correlated) errors. In the real world we can observe many other examples of private signal acquisition. One example is related to dealers' trading. The security analysts hired by dealers forecast accounting earnings for dealers' trade. These forecast data are private signals because they are only provided to dealers, and not disclosed to outside investors. Consider another example. Suppose firm A has a business relationship with firm B and through business activity firm A has private information about firm B's prospect.

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The final version of this paper was accepted in April 2000.

[1] We assume that the accounting earnings is equal to the cash flow. This is because in our model earnings will not be measured until time 3, the end of the time line, and hence the earnings based on accrual accounting is the same as the cash flow at time 3. Note, when the cash flow is disclosed, the time 3 payoff of the risky asset is common knowledge.

Therefore, firm A can earn profit by buying or selling firm B's shares.

Furthermore, we suppose that per capita supply of the risky asset is uncertain at times 1 and 2. Each trader cannot fully infer the time 1 average private signal from the price sequence because all variables are unobservable. Lin, Wang and Tsai (1995) show that there exists a noisy rational expectations equilibrium price of and demand for the risky asset in which the average private signal at dates 1 and 2 are not revealed by the price sequence. In that case, all historical prices are used in decision making, and trading volume is related to the differences between individual trader's beliefs and to the average belief among all traders. On the contrary, in our model of no supply shock, we analyse the equilibrium price of and demand for the risky asset when the sequence of prices does not reveal the time 1 average private signal but the time 2 equilibrium price reveals the time 2 average private signal. This setting implies the information content of a forthcoming accounting earnings contained in the time 1's private signal has only been partially impounded in both times' prices, but the information contained in the time 2's private signal to be released in the forthcoming earnings announcement has been fully impounded in current price. Grundy and McNichols (1989) assume that traders receive private and public signals at times 1 and 2, respectively. They show that no trade takes place in the second round when the time 1 average private signal is not revealed by the price sequence. In the case of supply without random shock, we show that the informed traders achieve a Pareto-optimal allocation at time 1 and they do not trade at time 2. That is, in this equilibrium, the time 2 price contains the information of the time 2 average private signal, and we can think of it as a public signal. Hence, the time 2 average private signal is redundant. The model of Grundy and McNichols is therefore a special case of ours.

Grundy and McNichols also demonstrate the existence of and examine the characteristics of linear and rational price functions when there is no time 2 variation in supply, with discussion about the effects of the addition of a second supply variation. Similarly, we first examine the properties of price functions without the time 2 supply shocks, and then relax this assumption. As developed by Lang, Litzenberger and Madrigal (1992), we have two groups of traders participating in the market. The traders of one group, referred to as the informed traders, privately receive imperfect information about the firm's end-of-period liquidating value prior to trade. The noise traders are the second group of traders, and their trades are exogenously random variables with distributions that are independent of their information and the risky asset's price. That is, their demand for the risky asset is

unrelated to the information content of the public or private signals, such as the information content of an earnings announcement. This noise trading is a convenient device to ensure price is not fully informative. We also investigate the patterns of trading volume in the setting where pure noise trading volume is correlated or uncorrelated with observable market variables, such as prices and public releases.

Our results indicate that when pure noise trading volume is uncorrelated with observable market variables, no informed trading occurs with constant net supply. And when net supply is with random shock, the time 2 holding units of the risky asset by the informed and the noise traders are different from the time 1 holding units, but only the informed trading volume is predictable. In the case of pure noise trading volume being correlated with observable market variables, informed traders also do not trade when there is no supply shock. On the other hand, when net supply contains random shocks, volume consists of noise trading and informed trading. They both constitute the predictable components of trading volume. However, when supply contains random shock, the time 2 average private information is only partially revealed irrespective of pure noise trading being uncorrelated or correlated with market variables. Moreover, to reveal the empirical implications of a theoretical model of trading volume, we also derive a model to describe what factors would influence the total trading volume. With supply shocks, no matter whether pure noise trading is correlated or uncorrelated with observable variables, our model shows that total trading volume is related to the market price of the risky asset and informed traders' individual expectations as well as the average expectation of the liquidating value of the risky asset in both periods.

In the following sections, a two-period model of asset prices and demands is introduced. Section 2 describes the equilibrium price in which the time 1 average private signal is not fully revealed by the sequence of prices, but the time 2 average private signal is. Section 3 shows and compares the patterns of trading volume and their empirical implications in the settings of pure noise trading being correlated and uncorrelated with observable market variables. Conclusions and suggestions for future research are contained in Section 4.

2. The basic model
The basic framework for our analysis follows Grundy and McNichols (1989), and Brown and Jennings (1989). There are two time periods (three dates). A riskless asset and one risky asset are exchanged in markets opening at times $t = 1$ and $t = 2$. Consumption occurs only at $t = 3$ when each share of the riskless asset pays 1 unit and the risky

asset provides a random payoff $\tilde{F}$.[2] The risk-free rate is assumed to be 0. A set of N informed traders indexed by $i = 1,2,...,N$ own random endowments $\tilde{\xi}_i$ of the risky asset. The endowments are independently and identically normally distributed with mean μ_x and variance $N\sigma_x^2$. Because total supply of the risky asset from informed traders is equal to total endowment of the risky asset from informed traders, total supply of the risky asset is calculated by $\Sigma_i \tilde{\xi}_i$. Hence, the per capita supply of the risky asset from informed traders, $\tilde{X}$, is $(\Sigma_i \tilde{\xi}_i)/N$.[3] We consider the limiting results when traders are countably infinite in number, and per capita supply of informed traders, $\tilde{X}$, is then normally distributed with mean μ_x and variance σ_x^2.[4] The correlation between $\tilde{\xi}_i$, and $\tilde{X}$ converges to zero as N goes to infinity. Thus, trader i's observation of $\tilde{\xi}_i$ cannot provide any information about the realisation of $\tilde{X}$ under the limiting economy.

At the first trading date, informed trader i receives a private signal

$$\tilde{Y}_i = \tilde{F} + \tilde{w} + \tilde{e}_i \qquad (1)$$

where $\tilde{F}$ is the per-unit payoff from the risky asset that has a normal distribution with mean zero and variance σ_F^2, $\tilde{w}$ is a common noise term that has a normal distribution with mean zero and variance σ_w^2, and $\tilde{e}_i$ is an idiosyncratic noise term that has a normal distribution with mean zero and variance σ_e^2. The random variables $\tilde{F}$, $\tilde{w}$ and $\tilde{e}_i$ are independent of one another. Furthermore, the idiosyncratic noise terms $\tilde{e}_i$ are uncorrelated, and hence independent across traders, that is $E[\tilde{e}_i \cdot \tilde{e}_j] = 0$ for all $i \neq j$.

At the second trading date, informed trader i observes a private signal

$$\tilde{Z}_i = \tilde{F} + \tilde{v} + \tilde{\eta}_i \qquad (2)$$

where $\tilde{v}$ is a common noise term that has a normal

distribution with mean zero and variance σ_v^2, and $\tilde{\eta}_i$ is an idiosyncratic noise term that has a normal distribution with mean zero and variance σ_η^2. The random variables $\tilde{F}$, $\tilde{v}$ and $\tilde{\eta}_i$ are independent of one another. The signals' idiosyncratic errors are independent across traders, which means $E[\tilde{\eta}_i \cdot \tilde{\eta}_j] = 0$ for all $i \neq j$. Moreover, the common errors $\tilde{w}$ and $\tilde{v}$ are uncorrelated. Similarly, $\tilde{\eta}_i$ is independent of $\tilde{e}_i$. We refer to this case as intertemporal independence, a situation in which, say, two accounting earnings forecasts, at two different dates, have uncorrelated errors. The random variables are assumed to be independent and multivariate normal. In sum, the flow of information in the market is as follows.

period 1		period 2	
date 1		date 2	date 3
observe $\tilde{Y}_i$		observe $\tilde{Z}_i$	consume $\tilde{C}_i$
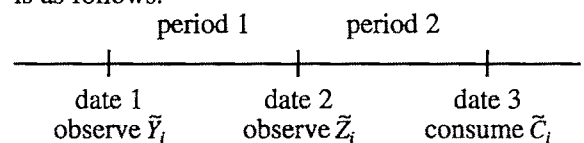
We denote by I_{it} the time t information set on which informed trader i conditions his investment decisions, and $\tilde{P}_t$, the time t market-clearing price of the risky asset. The trader i's initial wealth in the first round is $\tilde{W}_{i1}$, where $\tilde{W}_{i1} = \tilde{\xi}_i \tilde{P}_1 \cdot \tilde{W}_{i2}$ is trader i's initial wealth in the second round. Also, the cost of information acquisition is K_t ($t=1,2$).[5] Traders are assumed to have negative exponential utility of final consumption $\tilde{C}_i$, and informed trader (or speculative trader) i chooses a feasible trading strategy to maximise the expected utility of consumption at time 3:

$$E\left[U\left(\tilde{C}_i\right)\right] = E\left[-\exp\left(-r_i\tilde{C}_i\right)\right]$$

where r_i is trader i's coefficient of absolute risk aversion. For all traders, $r_i \in [r_L, r_U]$, with $r_L > 0$ and $r_U < \infty$. Following Lang, Litzenberger, and Madrigal (1992), the speculative trading volume at time t is defined as[6]

$$\tilde{V}_t = \frac{1}{2}\sum_i |\Delta\tilde{x}_{it}|$$

where $\tilde{x}_{it}$ is trader i's holding units of the risky asset at time t and $\Delta\tilde{x}_{it}$ is the change in trader i's holdings at time t.[7] The unmodeled noise traders now enter to inject randomness in the supply of the

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[2] At time 3, consumption occurs, as does an accounting earnings announcement. Because our model assumes that the cash flow is equal to the accounting earnings at time 3, the time 3 payoff (liquidating value) of the risky asset, $\tilde{F}$, is also the accounting earnings.

[3] We denote $\tilde{X}_t$ as the random per capita supply of the risky asset from informed traders at time t, $t=1,2$. If $\tilde{X}_1 = \tilde{X}_2$, we denote both periods' per capita supply of informed traders by $\tilde{X}$.

[4] Grossman (1976, 1978) argues that the equilibrium price aggregates the available information perfectly. Hellwig (1980) indicates that Grossman's agents are slightly schizophrenic. The covariance between 'noise' in individual information and 'noise' in the price is non-zero because the number of agents is finite, and each agent exerts a non-negligible influence on the price. Therefore, although the equilibrium prices of the limit economy are not generally correct for economies with finitely many traders, it can somewhat solve part of the Grossman's problem. Following Lang, Litzenberger, and Madrigal (1992), and Hellwig (1980), our paper considers the limit economy in a large market. This analysis will lead to an alternate view of the aggregation of information through the price.

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[5] We assume that there is no connection between the precision of private signals and information acquisition costs.

[6] Leone, Nelson and Nottingham (1961) indicate that measurements are frequently recorded without their algebraic sign. The effect of dropping the sign is to add the otherwise negative values to the positive values. Geometrically, this amounts to folding the negative side of the distribution onto the positive side. When the underlying distribution (of the algebraic values) is normal, the distribution of the absolute measurement is here described as the folded normal distribution. Therefore, in our model, $|\Delta\tilde{x}_{it}|$ is folded-normally distributed.

risky asset. That is, in addition to the informed traders, we assume that there exists a population of noise traders in the market whose aggregate supply of the risky asset in period t is given by the random variable $\tilde{\Theta}_t$. The trade of (unmodeled) noise traders is an exogenously specified random variable with a distribution that is independent of the risky asset's price and traders' information. Therefore, the units of the risky asset of informed trader i, $\tilde{x}_{it}$, is not held by the noise traders at time t. If S is the total market supply of the risky asset, the net supply of the informed traders is then given in period t by $\Sigma_i \tilde{x}_{it} = S - \tilde{\Theta}_t$, $t = 1,2$. We assume for the time being that total market supply remains constant in both periods.

Our model assumes that each informed trader receives a private signal containing a common error and an idiosyncratic error, possibly different, in each period before he trades. We describe a noisy rational expectations equilibrium where the supply of one trader is unobservable by the others and a second trading date is allowed. Informed trader i bases his investment decisions on both private information and market price. This implies that the information sets of trader i for the first and second trading dates are $I_{i1} = \{\tilde{P}_1, \tilde{Y}_i\}$ and $I_{i2} = \{\tilde{P}_1, \tilde{P}_2, \tilde{Y}_i, \tilde{Z}_i\}$, respectively. Because the realisation of per capita supply of informed traders at time t, $\tilde{X}_t$ ($t = 1,2$), is unobservable, the equilibrium price $\tilde{P}_1$ is a linear function of the per capita supply $\tilde{X}$ and the average private signal $\bar{Y}$.[8] Moreover, the time 2 price $\tilde{P}_2$ is a linear function of the supply $\tilde{X}$, the average signal $\bar{Y}$, the price history $\tilde{P}_1$, and the time 2 average private signal $\bar{Z}$. That is, a linear conjecture of $\tilde{P}_1$ and $\tilde{P}_2$ can be written as:

$$\tilde{P}_1 = \alpha_0 + \alpha_1 \bar{Y} + \alpha_2 \tilde{X} \qquad (3)$$

$$\tilde{P}_2 = \beta_0 + \beta_1 \bar{Y} + \beta_2 \tilde{X} + \beta_3 \bar{Z} + \beta_4 \tilde{P}_1 \qquad (4)$$

where $\bar{Y} \equiv \lim_{N \to \infty} (\Sigma \tilde{Y}_i / N) = \tilde{F} + \tilde{w}$, $\bar{Z} \equiv \lim_{N \to \infty} (\Sigma \tilde{Z}_i / N) = \tilde{F} + \tilde{v}$. The limiting results of $\tilde{Y}_i$ and $\tilde{Z}_i$ imply that

the time t price $\tilde{P}_t$ is not influenced by trader i's idiosyncratic error as $N \to \infty$. Since in the second period $\tilde{P}_1$ and $\tilde{P}_2$ are observable, the condition ensuring that the average private signal $\bar{Y}$ is not revealed (is revealed) by the sequence of prices is $\alpha_1/\alpha_2 = \beta_1/\beta_2$ ($\alpha_1/\alpha_2 \neq \beta_1/\beta_2$). Moreover, the price $\tilde{P}_2$ can reveal the average signal $\bar{Z}$ when the two equations are linearly dependent, that is, when $\alpha_1/\alpha_2 = \beta_1/\beta_2$.[9] In this case, the information set of informed trader i in period 2 can be rewritten as $I_{i2} = \{\tilde{P}_1, \tilde{P}_2, \tilde{Y}_i, \bar{Z}\}$. Because the price $\tilde{P}_1$ is perfectly correlated with the linear combination $\beta_1 \bar{Y} + \beta_2 \tilde{X}$, we can set $\beta_4 = 0$ without loss of generality.[10] As a result, the period 2 information set of trader i can be further simplified as $I_{i2} = \{\tilde{P}_2, \tilde{Y}_i, \bar{Z}\}$. In sum, $\bar{Y}$ is not revealed and $\bar{Z}$ is revealed by the price sequence $\{\tilde{P}_1, \tilde{P}_2\}$ if $\alpha_1/\alpha_2 = \beta_1/\beta_2$ (see Appendix 1 for details). We examine some properties of this particular linear rational expectations equilibrium as follows.

2.1. The equilibrium price and demand functions at time 2

Using the backward solution technique of dynamic programming, we first solve the equilibrium price of and demand (holding units) for the risky asset in the second period. Secondly, we solve the time 1 equilibrium price and demand. The expected payoff (accounting earnings) is $E[\tilde{P}_2 | \tilde{P}_1, \tilde{Y}_i]$ and $E[\tilde{F} | \tilde{P}_2, \tilde{Y}_i, \bar{Z}]$ in the first and second periods, respectively. Informed trader i chooses $\tilde{x}_{it}$ to maximise the expected utility of his final consumption. Then the optimal trading strategy in the second period is

$$\underset{\tilde{x}_{i2}}{MAX} \quad E\left[-e^{-r_i \tilde{C}_i} | I_{i2}\right]$$

$$s.t. \quad \tilde{C}_i = \tilde{W}_{i2} - \tilde{x}_{i2}(\tilde{P}_2 - \tilde{F}) - K_2 \qquad (5)$$

The optimal $\tilde{x}_{i2}$ and per capita demand of informed traders, $\tilde{X}$, can be expressed as (see Appendix 2 for details)[11]

$$\tilde{x}_{i2}^* = \frac{E[\tilde{F} | I_{i2}] - \tilde{P}_2}{r_i \sigma^2(\tilde{F} | I_{i2})} = \frac{b_0 + b_1 \tilde{P}_2 + b_2 \tilde{Y}_i + b_3 \bar{Z} - \tilde{P}_2}{r_i \sigma^2(\tilde{F} | I_{i2})} \qquad (6)$$

and

$$\tilde{X} = \frac{b_0 + b_1 \tilde{P}_2 + b_2 \bar{Y} + b_3 \bar{Z} - \tilde{P}_2}{\bar{r} \sigma^2(\tilde{F} | I_{i2})} \qquad (7)$$

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[7] Kim and Verrecchia (1991) indicate the definition of period 2 trading volume is $(1/2) \int |\tilde{D}_{2i} - \tilde{D}_{1i}| \, di$, where $\tilde{D}_{ti}$ is trader i's desired holding (gross demand) of the risky asset in period t, $t = 1,2$.

[8] As $\tilde{X}_1 = \tilde{X}_2$, we denote both periods' per capita supply of informed traders by $\tilde{X}$; see footnote 3.

[9] Lin, Wang and Tsai (1995) show that if the respective average private signals $\bar{Y}$ and $\bar{Z}$ at times 1 and 2 are not revealed by the price sequence, that is, $\alpha_1/\alpha_2 \neq \beta_1/\beta_2$, the market will have trading volume in both periods. Intuitively, if equilibrium price cannot fully reveal the private signal, informed traders must retrade based on the private signal.

[10] Because equation (4) can be rewritten as

$$\tilde{P}_2 = \beta_0 + \frac{\beta_2}{\alpha_2}(\tilde{P}_1 - \alpha_0) + \beta_3 \bar{Z} ,$$

the time 2 information set $\{\tilde{P}_1, \tilde{P}_2, \tilde{Y}_i, \bar{Z}\}$ is equivalent to $\{\tilde{P}_2, \tilde{Y}_i, \bar{Z}\}$. Informed traders can infer $\tilde{P}_1$ by observing $\tilde{P}_2$ and $\bar{Z}$, that is, traders can ignore $\tilde{P}_1$ in the second period.

[11] In equilibrium, per capita supply is equal to per capita demand. Hence, we also denote by $\tilde{X}$, per capital demand of the risky asset from informed traders at time t, $t = 1,2$. We consider the limiting results when traders are countably infinite in number, and thus $\tilde{X}_t = \lim_{N \to \infty} ((\Sigma_i \tilde{x}_{it})/N)$, where $\tilde{x}_{it}$ is trader i's holding units of the risky asset at time t. If $\tilde{X}_1 = \tilde{X}_2$, we denote both periods' per capita demand of informed traders by $\tilde{X}$.

where $\bar{r} = \dfrac{1}{\Sigma(N/r_i)}$. We rewrite (6) as

$$\tilde{x}_{i2}^* = \frac{\bar{r}}{r_i}\tilde{X} + \frac{b_2}{r_i\sigma^2\left(\tilde{F}\middle|\tilde{P}_2,\tilde{Y}_i,\tilde{Z}\right)}\tilde{e}_i \qquad (8)$$

Rewriting (7) makes clear the relation between the β in (4) and b in (7). We can then express the time 2 equilibrium price of the risky asset as

$$\tilde{P}_2 = \frac{b_0}{1-b_1} + \frac{b_2}{1-b_1}\bar{Y} + \frac{b_3}{1-b_1}\bar{Z} - \frac{\bar{r}\sigma^2\left(\tilde{F}\middle|I_{i1}\right)}{1-b_1}\tilde{X} \qquad (9)$$

2.2. The equilibrium price and demand functions at time 1

Now consider the determination of $\tilde{x}_{i1}$. In the first period, informed trader i seeks to allocate his initial wealth between the riskless and the risky assets in order to maximise the expected utility of final consumption.

$$\underset{\tilde{x}_{i2}}{MAX}\quad E\left[-e^{-r_i\tilde{C}_i}\middle|I_{i1}\right]$$

$$s.t. \quad \tilde{C}_i = \tilde{W}_{i1} - \tilde{x}_{i1}\left(\tilde{P}_1 - \tilde{P}_2\right) - K_1 - x_{i2}^*\left(\tilde{P}_2 - \tilde{F}\right) - K_2$$

Since x_{i2}^* is not a random variable in period 1,[12] the solution of the first period maximisation problem is (see Appendix 3 for details)

$$\tilde{x}_{i1}^* = \frac{E\left[\tilde{P}_2\middle|I_{i1}\right] - \tilde{P}_1}{r_i\sigma^2\left(\tilde{P}_2\middle|I_{i1}\right)} = \frac{a_2 + a_1\tilde{P}_1 + a_2\tilde{Y}_i - \tilde{P}_1}{r_i\sigma^2\left(\tilde{P}_2\middle|I_{i1}\right)} \qquad (10)$$

and averaging over all i gives

$$\tilde{X} = \frac{a_0 + a_1\tilde{P}_1 + a_2\bar{Y} - \tilde{P}_1}{\bar{r}\sigma^2\left(\tilde{P}_2\middle|I_{i1}\right)} \qquad (11)$$

We can then express $\tilde{x}_{i1}^*$ as

$$\tilde{x}_{i1}^* = \frac{\bar{r}}{r_i}\tilde{X} + \frac{a_2}{r_i\sigma^2\left(\tilde{P}_2\middle|I_{i1}\right)}\tilde{e}_i \qquad (12)$$

Rewriting (11) makes clear the relation between the α in (3) and a in (11). Therefore, the equilibri-

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[12] Because $\alpha_1/\alpha_2 = \beta_1/\beta_2$ and $\tilde{X} = (\tilde{P}_1 - \alpha_0 - \alpha_1\bar{Y})/\alpha_2$, we can then obtain

$$\tilde{x}_{i2}^* = \frac{\bar{r}}{r_i}\tilde{X} - \frac{\beta_1}{\beta_2}\cdot\frac{\bar{r}}{r_i}\tilde{e}_i = \frac{\bar{r}}{r_i}\left[\left(\frac{\tilde{P}_1 - \alpha_0}{\alpha_2}\right) - \frac{\alpha_1}{\alpha_2}\tilde{Y}_i\right]$$

Hence, x_{i2}^* is not a random variable in period 1.
[13] The amount of volume due to noise trading can emerge from a variety of sources. For our purposes, it is sufficient to think of idiosyncratic liquidity demands as the cause. Also, all non-speculative trades belong to noise trades.

um price at time 1, $\tilde{P}_1$, can be written as follows.

$$\tilde{P}_1 = \frac{a_0}{1-a_1} + \frac{a_2}{1-a_1}\bar{Y} - \frac{\bar{r}\sigma^2\left(\tilde{P}_2\middle|I_{i1}\right)}{1-a_1}\tilde{X} \qquad (13)$$

Price changes around the time of earnings announcements are well documented. In our model, price changes occur prior to the release of an anticipated earnings announcement. The price changes prior to the earnings announcement are the result of endogenous acquisition of information about the forthcoming earnings announcement. The magnitude of the price changes depends on both the extent to which prior information acquisition has resulted in the forthcoming earnings announcement being impounded in $\tilde{P}_1$ and $\tilde{P}_2$, and the extent to which the amount of variation in prices is attributable to 'noise'.

3. Trading volume analysis

Under noisy rational expectations, the noise in prices is induced by uncertain supply, and thus traders' posterior expectations still remain divergent even after they observe prices. Trading volume arises from the heterogeneity of traders' assessments of the risky asset's future value as well as from the impact of net supply change. This implies that supply shocks and price changes have the effect of moving traders along their demand curve for the risky asset. Our paper assumes that there are two groups of traders in this economy, each of whom may trade assets at the beginning of periods 1 and 2. One group of traders, referred to as the informed traders (or speculative traders), are induced to trade from an analysis of optimal trade strategies, given their information and preferences. Noise traders are the other group. Their demands for the risky asset at the beginning of each period are unrelated to any information in the market. The supply shocks of the risky asset are assumed due to the nonspeculative trade,[13] that is, this component is not induced by information. Hence, if supply contains random shocks, the total trading volume may result from both the informed and the noise traders.

Section 2 shows how the prices would change when the time 2 average private signal is fully revealed but the time 1 average private signal is not. This section examines the patterns of trading volume. We first investigate the setting where pure noise trading volume is uncorrelated with the net trade between the noise and the informed traders. In the second setting, this assumption is relaxed.

3.1. Pure noise trading volume uncorrelated with observable variables

Denote by $\tilde{V}_{nt}$ ($t = 1,2$) the noise trading volume

at time t. From its definition, informed trading volume $\tilde{V}_t$ contains the trade among informed traders and half of the trade between the informed and the noise traders; another half is contained in noise trading volume $\tilde{V}_{nt}$. We assume $\tilde{V}_{nt} = \tilde{G}_t + \tilde{H}_t$, where $\tilde{G}_t$ is the pure noise trading and $\tilde{H}_t$ is half of the trade between the informed and the noise traders. The two components of noise trading, $\tilde{G}_t$ and $\tilde{H}_t$, have their respective empirical intuitions. The empirical intuition of the component $\tilde{H}_t$ is that informed traders trade with noise traders based on superior information about the firm's true cash flows, and noise traders trade with informed traders due to liquidity reasons. $\tilde{G}_t$ reveals the fact that a noise trader buys or sells stocks to another noise trader, both in need of liquidity. Informed traders' superior information comes from private acquisition or market variables such as prices, public disclosures, and analysts' forecasts. It follows that, when pure noise trading volume is uncorrelated with observable market variables, it is independent of the trade between the noise and the informed traders. Consequently, pure noise trading volume is unrelated to the net trade between the two groups of traders since the net trade contains the possibility of some volume of the trade between the informed and the noise traders being cancelled out due to different signs.

If pure noise trading volume is uncorrelated with observable market variables, then only restrictions based on the speculative component can be estimated. That is, speculative trading volume represents the 'predictable' component of volume.[14] This is because observable market variables, such as prices, public disclosures, and analysts' forecasts are independent of pure noise trading volume, and we cannot infer pure noise trading volume based on this information.[15] Therefore, a sufficient condition for pure noise trading volume being uncorrelated with market variables is that it is uncorrelated with the net trade between the noise and the informed traders.[16] However, in contrast to this case, in Section 3.2 we extend the model to consider pure noise trading being correlated with the net trade. Lang, Litzenberger, and Madrigal (1992) indicate that the empirical analysis based on the definition of speculative trading volume entails no loss of generality whether or not this correlation exists. In a market with a large number of informed traders, the change in informed

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[14] This issue implies the result in Lang, Litzenberger, and Madrigal (1992).

[15] When pure noise trading volume cannot be inferred, noise trading volume also cannot be estimated as the former is one component of the latter.

[16] Lang, Litzenberger, and Madrigal (1992) indicate that this hypothesis is not directly testable because noise trading volume cannot be separately observed.

[17] The change in trader i's holdings at time 1 is $\Delta \tilde{x}_{i1} = \tilde{x}_{i1} - \xi_i$.

trader i's holdings at time 2 is[17]

$$\Delta \tilde{x}_{i2} = \tilde{x}_{i2} - \tilde{x}_{i1}$$

$$= \frac{\left(\tilde{f}_{i2} - \tilde{f}_2\right) + \left(\tilde{f}_2 - \tilde{P}_2\right)}{r_i \sigma^2\left(\tilde{F}|I_{i2}\right)} - \frac{\left(\tilde{f}_{i1} - \tilde{f}_1\right) + \left(\tilde{f}_1 - \tilde{P}_1\right)}{r_i \sigma^2\left(\tilde{P}_2|I_{i1}\right)}$$

where $\tilde{f}_t$ is the average belief of all informed traders at time t, and $\tilde{f}_{i2} = E[\tilde{F}|I_{i2}]$ and $\tilde{f}_{i1} = E[\tilde{P}_2|I_{i1}]$ is informed trader i's posterior belief of the future payoff of the risky asset at times 2 and 1, respectively. Note, in our setting, $\tilde{f}_{it}$ ($t = 1,2$) is also informed trader i's posterior expectation regarding the future accounting earnings. Accordingly, no trade occurs in the second period when net supply of the informed traders is constant in both periods. In other words, the informed traders' holding of units of the risky asset remain fixed across both periods of trade. Note, the zero informed trading volume implies that the trade among the informed traders and the trade between the informed and the noise traders are both zero. As for noise trading, unfortunately we cannot predict its pattern. These properties are formalised in Proposition 1.

Proposition 1: In the setting of pure noise trading volume being uncorrelated with observable variables, if there exists a linear non-$\tilde{Y}$-revealing and $\tilde{Z}$-revealing rational expectations equilibrium with constant net supply, the informed traders achieve a Pareto-optimal allocation in the first period, and they do not trade in the second. This result shows that the informed traders ignore the opportunity to retrade in the second period, and the time 2 average private signal is redundant.

Proof. If net supply of the risky asset is the same across both periods, the informed trading volume for the risky asset at time 2 is (see Appendix 4 for details)

$$\tilde{V}_2 = \frac{1}{2} \sum_i \frac{1}{r_i} \left| \frac{b_2 \tilde{e}_i}{\sigma^2\left(\tilde{F}|I_{i2}\right)} - \frac{a_2 \tilde{e}_i}{\sigma^2\left(\tilde{P}_2|I_{i1}\right)} \right| \tag{14}$$

From (3) and (13), $\alpha_1/\alpha_2 = -a_2/\bar{r}\sigma^2\left(\tilde{P}_2|I_{i1}\right)$. Hence, (12) can be rewritten as

$$\tilde{x}_{i1}^* = \frac{\bar{r}}{r_i}\left(\tilde{X} - \frac{\alpha_1}{\alpha_2}\tilde{e}_i\right) \tag{15}$$

Similarly, we can express $\tilde{x}_{i2}^*$ as

$$\tilde{x}_{i2}^* = \frac{\bar{r}}{r_i}\left(\tilde{X} - \frac{\beta_1}{\beta_2}\tilde{e}_i\right) \tag{16}$$

From (15), (16), and $\alpha_1/\alpha_2 = \beta_1/\beta_2$, we obtain

$\tilde{x}_{12}^* - \tilde{x}_{12}^* = 0$. ∎

The contribution of Proposition 1 and its main difference from the previous articles are described as follows. Grundy and McNichols (1989) assume that traders acquire private signals at time 1 and observe a public signal at time 2. They show that no trade occurs in the second period if the sequence of prices cannot fully reveal time 1's average private signal and supply remains constant in both periods. On the contrary, in our model, the informed traders receive private signals in each period. Although Brown and Jennings (1989) also examine the setting of traders acquiring respective private signals in both periods, they only discuss the price change, but not the patterns of trading volume, nor whether private signals can be fully revealed by the price sequence. We show that the time 2 average private signal is fully revealed by the time 2 price, and thus the time 2 average private signal can be viewed as a public signal. Hence, our model is more general than the previous articles.

On the other hand, if the informed traders' holdings of the risky asset change across periods with random supply shocks, then the pricing relations in the first and second periods can be written as[18]

$$\tilde{P}_1 = \alpha_0 + \alpha_1 \bar{Y} + \alpha_2 \tilde{X}_1 \tag{17}$$

$$\tilde{P}_2 = \beta_0 + \beta_1 \bar{Y} + \beta_2 \tilde{X}_2 + \beta_3 \bar{Z} \tag{18}$$

where $\tilde{X}_1$ and $\tilde{X}_2$ denote the unobservable per capita supply of the informed traders in the first and second periods, respectively. Moreover, per capita supply of the informed traders at time 2, $\tilde{X}_2$, is induced by $\tilde{X}_2 = \tilde{X}_1 + \Delta\tilde{X}$, where $\Delta\tilde{X}$ is uncorrelated with all other variables. Because $\Delta\tilde{X}$ is unobservable, $\bar{Z}$ cannot be fully revealed by the price sequence. That is, in this case, $\bar{Z}$ is partially revealed by the price sequence even though $\alpha_1/\alpha_2 = \beta_1/\beta_2$. Hence, the information set is not $\{\tilde{P}_2, \bar{Y}_i, \bar{Z}\}$ but $\{\tilde{P}_2, \bar{Y}_i, \bar{Z}_i\}$. In the following, we first examine the change in the holding units of informed trader i at time 2. As for noise trading, we still can not predict its pattern. To grasp the empirical implications of a theoretical model of trading volume, the trading volume must be measured empirically. It is therefore useful to derive an expression of the total squared informed trading volume in the limit in order to remove the $\Delta\tilde{x}_{it}$ term within the absolute sign shown in trading volume model $\tilde{V}_t$. It also allows us to understand what factors would influence informed trading volume. Proposition 2 states the results.

Proposition 2: In the setting of pure noise trading volume being uncorrelated with observable variables, if there exists a linear non-$\bar{Y}$-revealing and partially-$\bar{Z}$-revealing rational expectations equilibrium with random supply shocks, a Pareto-optimal allocation is not achieved for the informed traders at time 1. They have no concordant beliefs concerning the time 2 price and will trade in the second round. Thus, the time 2 private signal is valuable. Moreover, total trading volume arises from the market price of the risky asset and from all informed traders' individual expectations as well as the average expectation of its liquidating price in both periods.

Proof. Informed trader i's optimal demand for the risky asset at each date is

$$\tilde{x}_{i1}^* = \frac{\bar{r}}{r_i}\tilde{X}_1 + \frac{a_2}{r_i\sigma^2\left(\tilde{P}_2|I_{i1}\right)}\tilde{e}_i$$

$$\tilde{x}_{i2}^* = \frac{\bar{r}}{r_i}\tilde{X}_2 + \frac{b_2}{r_i\sigma^2\left(\tilde{F}|I_{i2}\right)}\tilde{e}_i + \frac{b_3}{r_i\sigma^2\left(\tilde{F}|I_{i2}\right)}\tilde{\eta}_i$$

We can express $\tilde{x}_{i1}^*$ and $\tilde{x}_{i2}^*$ as

$$\tilde{x}_{i1}^* = \frac{\bar{r}}{r_i}\left(\tilde{X}_1 - \frac{\alpha_1}{\alpha_2}\tilde{e}_i\right)$$

$$\tilde{x}_{i2}^* = \frac{\bar{r}}{r_i}\left(\tilde{X}_2 - \frac{\beta_1}{\beta_2}\tilde{e}_i - \frac{\beta_3}{\beta_2}\tilde{\eta}_i\right)$$

The change in the ith trader's demands is

$$\tilde{x}_{i2}^* - \tilde{x}_{i1}^* = \frac{\bar{r}}{r_i}\left(\Delta\tilde{X} - \frac{\beta_3}{\beta_2}\tilde{\eta}_i\right)$$

Thus, the informed traders do not ignore the opportunity to retrade in the second period. Because the noise trading volume cannot be predicted, and only the informed trading volume is predicable, without loss of generality, the trading volume of the risky asset at time 2 is

$$\tilde{V}_2 = \frac{1}{2}\sum_i \frac{1}{r_i}\left|\bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right) + q_0\tilde{\eta}_i\right| \tag{19}$$

where $q_0 = b_3/\sigma^2(\tilde{F}|I_{i2})$. As $N \to \infty$, the squared trading volume can be expressed as the following function, which can be tested empirically. (See Appendix 5 for details)

$$\tilde{V}_2^2 = q_1 Var\left(\frac{\left(\tilde{f}_{i2} - \bar{f}_2\right)}{\sigma^2\left(\tilde{F}|I_{i2}\right)} - \frac{\left(\tilde{f}_{i1} - \bar{f}_1\right)}{\sigma^2\left(\tilde{F}|I_{i1}\right)}\right)$$
$$+ q_2\bar{r}^2\left(g_0 + g_1 P_2 + g_2\bar{f}_2 + g_3 P_1 + g_4\bar{f}_1\right)^2$$

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[18] Contrast to Section 3.2, because noise trading volume is uncorrelated with observed variables and noise trading cannot be estimated, this section only considers random shocks arises from the noise traders.

$$+q_3\bar{r}\left(g_0 + g_1 P_2 + g_2 \bar{f}_2 + g_3 P_1 + g_4 \bar{f}_1\right) \quad \blacksquare \quad (20)$$

Equation (20) shows that volume arises from the market price of the risky asset and from informed traders' individual expectations as well as the average expectation of the liquidating value of the risky asset in both periods. Specifically, the variance of the change in the difference between individual and average beliefs at time 2 is correlated with trading volume.

Our findings are significant and different from the previous papers. Brown and Jennings (1989) demonstrate that change in the value of technical analysis is caused by change in the variance of the supply increments, that is, change in noise. They do not examine how information revealed by the price sequence affects trading volume. Demski and Feltham (1994) highlight the variance of price changes of the risky asset between the two trading rounds, and the expected trading volume at the public announcement date. Like Grundy and McNichols (1989), they assume that the private signals at the first date provide information about the public report at the second date. However, in fact, informed traders often acquire various private signals about public information before its disclosure. Hence, our setting is more consistent with economic intuition than these previous models.

The empirical intuition behind (20) is as follows. A trader's posterior expectation of the future accounting earnings, $\tilde{f}_{it}$ (t =1,2), can be proxied by individual analyst's forecasts of firms' earnings. The average of all analysts' earnings forecasts can be used as a proxy for the average of traders' posterior expectations of the future accounting earnings, $\bar{f}_t$ (t =1,2). According to (20), total trading volume at time 2 can be measured by analysts' individual and average earnings forecasts as well as the asset's prices in both periods.[19] Hence, (20) can reveal the contribution of our model with respect to empirical implications.

3.2. Pure noise trading volume correlated with observable variables

Section 3.1. examines the setting in which pure noise trading volume is uncorrelated with the net trade between the noise and the informed traders.

In the case of supply shocks, we can only estimate the informed trading volume, which includes two components. One is the trade between the noise and the informed traders; the other, the trade among the informed traders. As for noise trading volume, it cannot be predicted. In this section, we turn to consider the situation where pure noise trading volume is correlated with observable variables. In the case of no supply shocks, the result would be the same as that in Section 3.1, where each informed trader has no incentive to trade at time 2. Hence, we do not discuss its characteristics again and focus in this section on the equilibrium with random supply shocks. We now show how to derive analogues of Proposition 2 when pure noise trading volume is correlated with the net trade between the noise and the speculative traders. This characterisation has the following empirical implications. Although, in most cases, noise traders trade due to liquidity needs, it is possible that their trading behaviour is influenced by that of the informed traders, particularly when the informed trader's buy or sell orders are large enough to send precise and strong signals. As mentioned in Section 3.1, informed traders trade based on their analysis of market variables as well as private acquisition. Consequently, when noise traders' trading decisions are influenced by informed traders, pure noise trading is correlated with observable market variables and its volume is therefore predictable. Since speculative trading volume does not constitute the entire predictable component of volume, we need to induce a model of total trading volume for the informed and the noise traders.

Because there are two types of traders in this setting, the informed and the noise traders, the total market supply of the risky asset, S, is the sum of the net supply of all informed traders and the aggregate supply of noise traders. Recall that the net supply of informed traders is

$$\sum_i \tilde{x}_{it} = S - \tilde{\Theta}_t$$

where $\tilde{\Theta}_t$ denotes the aggregate supply of the noise traders, t=1,2.[20] In the case of no supply noise, the holding units of the informed trader i and the aggregate holdings of noise traders will remain unchanged in both periods. This implies that $\tilde{X}_1 = \tilde{X}_2$ and $\tilde{\Theta}_1 = \tilde{\Theta}_2$, and thus we denote both periods' per capita supply of informed traders by $\tilde{X}$ and the aggregate supply of noise traders by $\tilde{\Theta}$. However, if total supply remains constant in both periods and net supply contains random shock,[21] then

$$\sum_i (\tilde{x}_{i2} - \tilde{x}_{i1}) = -(\tilde{\Theta}_2 - \tilde{\Theta}_1) \quad (21)$$

Equation (21) can be expressed as

$$\sum_i \Delta \tilde{x}_{i2} = -\Delta \tilde{\Theta}_2 \quad (22)$$

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[19] For this purpose, researchers can use Institutional Brokers Estimate System (IBES) provided by the Lynch, Jones and Ryan Company in the US. This database reports detailed survey data on analysts' forecasts of firms' annual earnings.

[20] In equilibrium, the net supply of all informed traders is equal to the aggregate demand of informed traders. Hence, we also use $\Sigma_i \tilde{x}_{it}$ as the aggregate demand of informed traders. Similarly, $\tilde{\Theta}_t$ can represent the aggregate demand of noise traders.

[21] Because $\Sigma_i \tilde{x}_{it} = S - \tilde{\Theta}_t$, $\Sigma_i (\tilde{x}_{i2} - \tilde{x}_{i1}) = (S_2 - S_1) - (\tilde{\Theta}_2 - \tilde{\Theta}_1)$. Also, total supply remains constant in both periods (i.e., $S_2 = S_1$) so that $\Sigma_i (\tilde{x}_{i2} - \tilde{x}_{i1}) = -(\tilde{\Theta}_2 - \tilde{\Theta}_1)$.

This implies that the sum of the change in the holding units of the informed traders at time 2, $\sum_i \Delta \tilde{x}_{i2}$, is equal to the change in the aggregate holding units of the noise traders at time 2, $\Delta \tilde{\Theta}_2$, but with different signs. From (22), $\sum_i \Delta \tilde{x}_{i2}$ represents the net trade, so does $\Delta \tilde{\Theta}_2$. Note, $\sum_i \Delta \tilde{x}_{i2}$ contains the possibility of the trade between the informed and the noise traders being cancelled out due to different signs.

Recall that the definition of informed trading volume at time 2 is

$$\tilde{V}_2 = \frac{1}{2} \sum_i |\Delta \tilde{x}_{i2}| > 0$$

and it consists of the trade among the informed traders as well as half of the trade between the informed and the noise traders. In this section, we examine the case where pure noise trading volume is correlated with observable market variables. Being a primitive quantity, noise trading volume at time 2, $\tilde{V}_{n2}$, represents the trade among the noise traders and half of the trade between the informed and the noise traders. Because the trades of un-modelled noise traders are exogenously specified, our paper incorporates this variable to inject randomness in the supply of the risky asset. The reason that we add such exogenous variables $\tilde{G}_t$ and $\tilde{H}_t$ in the model is to demonstrate the possibility of estimating trading volume between different parties empirically. Our analysis shows that in the case of noisy supply the total trading volume of the risky asset at time 2, $\tilde{V}_{total2}$, arises from the noise and the informed traders, that is, $\tilde{V}_{total2} = \tilde{V}_2 + \tilde{V}_{n2}$.[22] The following proposition summarises the results.

Proposition 3: In the setting of pure noise trading volume being correlated with observable variables, if there exists a linear non-$\bar{Y}$-revealing and partially-$\bar{Z}$-revealing rational expectations equilibrium with random supply shocks, the informed and the noise traders will retrade at time 2. Total trading volume arises from the informed and the noise traders and these volumes are predictable. In addition, total trading volume is increasing with the relationship between noise trading and the absolute value of the net trade.

Proof. Our analysis suppose that pure noise trading volume $\tilde{G}_t$ is correlated with the net trade between the informed and the noise traders, $\Delta \tilde{\Theta}_t$, that is, $Cov(\tilde{G}_t, \Delta \tilde{\Theta}_t) \neq 0$. From (22), it is reasonable to assume that pure noise trading volume at time 2,

$\tilde{G}_t$, is positively related to $|\sum_i \Delta \tilde{x}_{i2}|$. Consequently, the pure noise trading volume at time 2 can be written as

$$\tilde{G}_2 = k \, |\sum_i \Delta \tilde{x}_{i2}| \qquad (23)$$

where k is constant, representing the relationship between pure noise trading volume and the absolute value of the net trade between the informed and the noise traders. Similarly, half of the trade between the informed and the noise traders, $\tilde{H}_2$, can be expressed as

$$\tilde{H}_2 = l \, |\sum_i \Delta \tilde{x}_{i2}| \qquad (24)$$

where l represents the relationship between $\tilde{H}_2$ and the absolute value of the net trade. Because $\tilde{V}_{n2} = \tilde{G}_2 + \tilde{H}_2$,

$$\tilde{V}_{n2} = k \, |\sum_i \Delta \tilde{x}_{i2}| + l \, |\sum_i \Delta \tilde{x}_{i2}|$$

$$\equiv h \, |\sum_i \Delta \tilde{x}_{i2}| \qquad (25)$$

where h represents the relationship between noise trading volume and the absolute value of the net trade. Because $\tilde{V}_{total2}^2 = (\tilde{V}_2 + \tilde{V}_{n2})$,[2] we also obtain that factors influencing total trading volume include the market price of the risky asset and the informed traders' individual expectations as well as the average expectation of its liquidating price in both periods. In addition, total trading volume is increasing with the relationship between $\tilde{V}_{n2}$ and $|\sum_i \Delta \tilde{x}_{i2}|$ (see Appendix 6 for details). ■

Proposition 3 shows that in the setting of noise trading volume being correlated with the net trade, total trading volume results from the trade among the informed traders, the trade among the noise traders, and the trade between the informed and noise traders. Each of the three components can be predicted. Our results differ from the recent related papers, for example, Kim and Verrecchia (1994), McNichols and Trueman (1994), Demski and Feltham (1994), Kim and Verrecchia (1991), Grundy and McNichols (1989), and Brown and Jennings (1989). The first two papers assume informed traders are risk neutral and the latter four, like our model, that they are risk averse. But these papers do not investigate, in the framework of individual trader observing private signals at each trading date, whether the price sequence can fully reveal the average private signal in both periods and cause informed traders to revise their posterior beliefs, and thus induce trade. In addition to the derivation of the trading volume model, we examine how this model can be applied to empirical analysis. Note, including the noise trading volume in the model in Section 3, our paper attempts to formulate a trading volume model as a basis for

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[22] From the definition of $\tilde{V}_n$ it seems that noise trading volume at time t, $\tilde{V}_{nt}$, can also be written as $\tilde{V}_{nt} = (1/2) \sum_n |\Delta \tilde{x}_{nt}| = \tilde{G}_t + \tilde{H}_t$, where $\Delta \tilde{x}_{nt}$ is the change in the holding units of noise trader n at time t. However, noise trader n's holding units at times 1 and 2, $\tilde{x}_{n1}$ and $\tilde{x}_{n2}$, are not modeled in this paper, and hence are exogenous. Assuming there is some relationship between $\tilde{V}_{nt}$ and the net trade, we can use this relationship to estimate $\tilde{V}_{nt}$, and hence get an estimate of $\tilde{V}_{total\, t}$.

further empirical research.

In this case, total trading volume is influenced by the same factors as (20). But different from (20), its magnitude is increasing with h. That is, the greater the relationship between noise trading and the absolute value of the net trade, the more the total trading volume. Therefore, concerning factors influencing trading volume, our results are similar to Lin, Wang and Tsai (1995). Nevertheless, we incorporate noise traders in our model while Lin, Wang and Tsai (1995) only consider informed traders.

4. Conclusions

We have developed a two-period, three-date noisy rational expectations model in which we assume traders acquire prior to trade a private signal about the time 3 accounting earnings at both time 1 and time 2. At time 3 consumption occurs, as does the public announcement of the accounting earnings, which is also the cash flow. The two private signals about two accounting earnings forecasts, at two different dates, are useful for forming expectations about the firm's cash flows, but there is no correlation in their noise terms. The acquisition of private signals is very common in the real world. Dealers' trading with their security analysts' forecasts and employees' trading with their superior information of the company's performance are typical examples. The traders either trade to a Pareto optimum at time 1 or they have no concordant beliefs concerning future prices, depending on which equilibrium characterises the sequence of dates.

We showed the following results. First, there exists a rational expectations equilibrium price of and demand for the risky asset when the time 1 average private signal is not revealed by price sequence but the time 2 average private signal is. Secondly, we investigate the setting where pure noise trading volume is uncorrelated with observable market variables. When the risky asset has constant net supply, the informed traders would ignore the opportunity to retrade and a Pareto-optimal allocation is achieved at time 1, and the time 2 private signal is redundant. In contrast, when supply is with random shocks, the informed traders would trade in the second round, and the time 2 private signal is valuable. Unfortunately, in this case, noise trading volume is not predictable. Finally, under the setting of pure noise trading vol-

ume being correlated with observable market variables, when supply shocks across periods of trade are random, the supply shocks would cause the noise and the informed traders to trade in the second period. Since speculative trading volume does not constitute the entire predictable component of volume, we induce a model of total trading volume for the informed and the noise traders. On the other hand, without supply shocks, the holdings of the risky asset by the informed traders at times 1 and 2 remain unchanged, and no trade occurs at date 2.

In sum, trading volume and price reactions to information, consistent with the empirical implications, depend on the information environment as a whole. In the case of random supply shocks and pure noise trading being uncorrelated with the net trade, our model shows that total trading volume arises from the market price of the risky asset and informed traders' individual expectations as well as the average expectation of the liquidating value of the risky asset in both periods. However, if pure noise trading is correlated with observable variables, total trading volume is also influenced by the relationship between the absolute value of the net trade and the noise trading, and the greater the relationship, the more the total trading volume. Our models have implications for researchers interested in examining the price and trading volume responses to private signals since they indicate many factors related to trading volume reactions. Thus, the model may provide a useful structure for those interested in empirically examining the determinants of trading volume reactions to information releases.

Further studies can examine whether there exists positive autocorrelation between the trading volume at times 1 and 2 and how acquisition cost is affected by the precision of information. Wang (1994) examines how trading volume is related to the absolute change in prices and dividends and how these relations are affected by information asymmetry. Demski and Feltham (1994) show that the three components of trading volume are the change in the holdings of the unmodeled noise traders, the informed traders and the uninformed traders, when the trade of informed and uninformed traders are derived from an analysis of optimal strategies given their preferences and information. These also provide a direction for further discussions of our model developed above.

Appendix

Appendix 1: *Equilibrium characterisation of the two-period rational expectations model*
The ratios α_1/α_2 and β_1/β_2 can be solved as follows.

$$\frac{\alpha_1}{\alpha_2} = \frac{-\sigma_X^2}{\bar{r}\left(\sigma_w^2\sigma_X^2 + \frac{\alpha_1^2}{\alpha_2^2}\sigma_w^2\sigma_e^2 + \sigma_X^2\sigma_e^2\right)}$$

Also, $\dfrac{\beta_1}{\beta_2} = \dfrac{\theta}{\psi}$, where

$$\theta = \beta_1\beta_3\sigma_F^4\sigma_\eta^2 - \beta_1\beta_3\sigma_w^2\sigma_F^2\sigma_\eta^2 + \beta_3^2\sigma_F^4\sigma_\eta^2 + \beta_3^2\sigma_\eta^2\sigma_v^2\sigma_F^2 + \beta_2^2\sigma_F^2\sigma_\eta^2\sigma_X^2$$

$$+\beta_2^2\sigma_v^2\sigma_X^2\sigma_F^2 + 3\beta_3\beta_1\sigma_F^6 + 3\beta_3\beta_1\sigma_F^4\sigma_v^2 - \beta_1^2\sigma_F^4\sigma_w^2 - \beta_1^2\sigma_F^6$$

$$\psi = \beta_2^2\sigma_X^2\sigma_w^2\sigma_e^2\sigma_F^2 + 4\beta_1\beta_3\sigma_F^4\sigma_v^2\sigma_w^2 - 2\beta_1\beta_3\sigma_F^6\sigma_v^2 + \beta_1^2\sigma_w^2\sigma_e^2\sigma_v^2\sigma_F^2 + \beta_2^2\sigma_X^2\sigma_e^2\sigma_v^2\sigma_F^2$$

$$+2\beta_1\beta_3\sigma_F^4\sigma_v^2\sigma_e^2 + \beta_2^2\sigma_X^2\sigma_w^2\sigma_F^2\sigma_\eta^2 - \beta_3^2\sigma_F^6\sigma_\eta^2 + \beta_3^2\sigma_v^2\sigma_w^2\sigma_\eta^2\sigma_F^2 + 2\beta_1\beta_3\sigma_F^4\sigma_w^2\sigma_\eta^2$$

$$+\beta_1^2\sigma_w^2\sigma_\eta^2\sigma_e^2\sigma_F^2 - \beta_1^2\sigma_w^2\sigma_F^6 - 2\beta_3^2\sigma_F^8 - 3\beta_3^2\sigma_v^2\sigma_F^6 - \beta_1^2\sigma_F^6\sigma_e^2 + \beta_2^2\sigma_X^2\sigma_e^2\sigma_\eta^2\sigma_F^2$$

$$+\beta_3^2\sigma_v^2\sigma_e^2\sigma_\eta^2\sigma_F^2$$

Under the specified conditions, we have at least one real root for both ratios α_1/α_2 and β_1/β_2. Therefore, we can obtain the conditions of $\alpha_1/\alpha_2 = \beta_1/\beta_2$. In this case, the pricing relations (3) and (4) are linearly dependent and the sequence of prices does not reveal $\bar{Y}$, but they can reveal $\bar{Z}$.

Appendix 2: *Proof of optimal demand at time 2*

$$\underset{\tilde{x}_{i2}}{\text{MAX}}\, E\left[-e^{-r_i\left[\left(\tilde{W}_{i2} - \tilde{x}_{i2}\tilde{P}_2 - K_2\right) + \tilde{x}_{i2}\tilde{F}\right]}\Big| I_{i2}\right]$$

$$= \underset{\tilde{x}_{i2}}{\text{MAX}}\left(-e^{-r_i\tilde{W}_{i2}}\right)\left(e^{r_i\tilde{x}_{i2}\tilde{P}_2}\right)\left(e^{r_iK_2}\right)\left(e^{-r_i\tilde{x}_{i2}E\left(\tilde{F}|I_{i2}\right) + \frac{1}{2}r_i^2\tilde{x}_{i2}^2\sigma\left(\tilde{F}|I_{i2}\right)}\right)$$

Differentiating the exponent with respect to $\tilde{x}_{i2}$ and setting it equal to zero yields the optimal demand of Equation (6).

Appendix 3: *Proof of optimal demand at time 1*

$$\underset{\tilde{x}_{i1}}{\text{MAX}}\, E\left[-e^{-r_i\left[\left(\tilde{W}_{i1} - \tilde{x}_{i1}\tilde{P}_1 - K_1\right) + x_{i1}\tilde{P}_2\right]}\Big| I_{i1}\right] e^{-\frac{1}{2}r_i^2x_{i2}^2\sigma^2\left(\tilde{F}|I_{i2}\right)}$$

$$\equiv \underset{\tilde{x}_{i1}}{\text{MAX}}\, E\left[-e^{-r_i\left(\tilde{W}_{i1} - \tilde{x}_{i1}\tilde{P}_1 - K_1 + \tilde{x}_{i1}\tilde{P}_2\right)}\Big| I_{i1}\right]$$

$$= \underset{\tilde{x}_{i1}}{\text{MAX}}\left(-e^{-r_i\tilde{W}_{i1}}\right)\cdot\left(e^{r_i\tilde{x}_{i1}\tilde{P}_1}\right)\cdot\left(e^{-r_i\tilde{x}_{i1}E\left[\tilde{P}_2|I_{i1}\right] + \frac{1}{2}r_i^2\tilde{x}_{i1}^2\sigma^2\left(\tilde{P}_2|I_{i1}\right)}\right)$$

Differentiating the exponent with respect to $\tilde{x}_{i1}$ and setting it equal to zero yields the optimal demand of Equation (10).

Appendix 4: *Proof of Proposition 1*
By the projection theorem, informed trader i's posterior belief is given by

$$f_{i2} = E\left[\tilde{F}\middle|\tilde{P}_2, \tilde{Y}_i, \tilde{Z}\right] = b_0 + b_1\tilde{P}_2 + b_2\tilde{Y}_i + b_3\tilde{Z}$$

As $N\to\infty$, we have

$$\bar{f}_2 = \frac{\sum_i\left(b_0 + b_1\tilde{P}_2 + b_2\tilde{Y}_i + b_3\tilde{Z}\right)}{N} \to b_0 + b_1\tilde{P}_2 + b_2\bar{Y} + b_3\tilde{Z}$$

Thus in a market with a large number of traders, $\tilde{f}_{i2} - \bar{f}_2 = b_2\tilde{e}_i$. We can then write $plim(\bar{f}_2 - \tilde{P}_2)$ as $\bar{r}\bar{X}\sigma^2(\tilde{F}|I_{i2})$. Similarly, as $N\to\infty$, we can obtain $\tilde{f}_{i1} - \bar{f}_1 = a_2\tilde{e}_i$, and

$$p\lim\left(\bar{f} - \tilde{P}_1\right) = a_0 + a_1\tilde{P}_1 + a_2\bar{Y} - \tilde{P}_1 \tag{A1}$$

According to (11), we can rewrite (A1) as $\bar{r}\bar{X}\sigma^2(\tilde{P}_2|I_{i1})$.

Appendix 5: *Proof of Proposition 2*
The squared informed trading volume is

$$\tilde{V}_2^2 = \frac{1}{4}\sum_i\frac{1}{r_i^2}\left[q_0\tilde{\eta}_i + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right]^2 + \frac{1}{4}\sum_{i\neq j}\frac{1}{r_ir_j}\left|q_0\tilde{\eta}_i + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|\left|q_0\tilde{\eta}_j + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right| \tag{A2}$$

where $\tilde{X}_2 \sim N(\mu_{x_2}, \sigma_{x_2}^2)$, $\tilde{X}_1 \sim N(\mu_{x_1}, \sigma_{x_1}^2)$. If traders' risk aversion coefficients are ex ante independent of $\tilde{e}_i$, $\tilde{\eta}_i$, and $\tilde{F}$, then, taking probability limit ($p$lim), the second term of (A2) without the constant 1/4 can be written as

$$p\lim\sum_{i\neq j}\frac{1}{r_ir_j}\left|q_0\tilde{\eta}_i + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|\left|q_0\tilde{\eta}_j + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right| \tag{A3}$$

Since r_i, $\tilde{X}_i$, and $\tilde{\eta}_i$ are independent, then the expectation of the product of $\dfrac{1}{r_ir_j}$ and $\left|q_0\tilde{\eta}_i + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|$ $\left|q_0\tilde{\eta}_j + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|$ is equal to the product of the expectation of $\dfrac{1}{r_ir_j}$ and the expectation of $\left|q_0\tilde{\eta}_i + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|$ $\left|q_0\tilde{\eta}_j + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|$. Also, $\sum_{i\neq j}E\left[\dfrac{1}{r_ir_j}\left|q_0\tilde{\eta}_i + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|\left|q_0\tilde{\eta}_j + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|\right]$ has $N(N-1)$ identical terms, but

$\sum_{i\neq j}E\left[\dfrac{1}{r_ir_j}\right]\cdot\sum_{i\neq j}E\left[\left|q_0\tilde{\eta}_i + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|\left|q_0\tilde{\eta}_j + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|\right]$ has $N^2(N-1)^2$ identical terms. Therefore, the expectation should be written as

$$E\left[\sum_{i\neq j}\frac{1}{r_ir_j}\left|q_0\tilde{\eta}_i + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|\left|q_0\tilde{\eta}_j + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|\right]$$

$$= \frac{1}{N(N-1)}E\left[\sum_{i\neq j}\frac{1}{r_ir_j}\right]\cdot E\left[\sum_{i\neq j}\left|q_0\tilde{\eta}_i + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|\left|q_0\tilde{\eta}_j + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|\right]$$

Because the expectation's relationship holds, the $p$lim's relationship must hold too. Accordingly, (A3) can be written as

$$p\lim\sum_{i\neq j}\frac{1}{r_ir_j}\sum_{i\neq j}\frac{\left|q_0\tilde{\eta}_i + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|\left|q_0\tilde{\eta}_j + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|}{N(N-1)} \tag{A4}$$

Moreover, for large samples ($N\to\infty$), *given the realisation* $\tilde{X}_2 - \tilde{X}_1$, we would expect

$$\sum_{i\neq j}\left|q_0\tilde{\eta}_i + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|\left|q_0\tilde{\eta}_j + \bar{r}\left(\tilde{X}_2 - \tilde{X}_1\right)\right|$$

Appendix 5 *(continued)*

to behave approximately as the sum of independent random variables so that

$$p\lim \sum_{i \neq j} \frac{\left|q_0\tilde{\eta}_i + \bar{r}(X_2 - X_1)\right|\left|q_0\tilde{\eta}_j + \bar{r}(X_2 - X_1)\right|}{N(N-1)}$$

$$= p\lim \sum_i \frac{\left|q_0\tilde{\eta}_i + \bar{r}(X_2 - X_1)\right|}{N} p\lim \sum_j \frac{\left|q_0\tilde{\eta}_j + \bar{r}(X_2 - X_1)\right|}{(N-1)} \qquad \text{(from Slutsky's theorem)}$$

$$= E\left(|B_1|\,|\Delta X\right)E\left(|B_2|\,|\Delta X\right)$$

where, given the realisation of $\Delta X = X_2 - X_1$, B_i is the normally distributed with mean $\bar{r}\Delta X$ and variance $q_0^2\sigma_\eta^2$. Note that, according to Slutsky's theorem, $p\lim AB = p\lim A\, p\lim B$ (See Judge et al. 1988, and Durrett 1991). From Leone, Nelson, and Nottingham (1961), if Y is the normally distributed, $Y \sim N(\mu,\sigma^2)$, then $|Y|$ has a folded normal distribution and its mean is

$$E|Y| = \sqrt{2/\pi}\,\sigma e^{-\mu^2/2\sigma^2} + \mu\left[1 - 2F(-\mu/\sigma)\right]$$

Similarly, because $B_i|\Delta X$ is the normally distributed, then $E(|B_i|\,|\Delta X)$ can be written as

$$E\left(|B_i|\,|\Delta X\right) = \sqrt{\frac{2}{\pi}q_0^2\sigma_\eta^2}\exp\left[-\frac{1}{2}\left(\frac{\bar{r}\Delta X}{2q_0\sigma_\eta}\right)^2\right] + \bar{r}\Delta X\left[1 - \Phi\left(-\frac{\bar{r}\Delta X}{\sqrt{2}q_0\sigma_\eta}\right)\right]$$

where Φ is the cumulative density of the normal distribution. Hence, for large σ_η^2, that is, if investors' period 2 private signal contains large variance of idiosyncratic error, $E(|B_i|\,|\Delta X)$ can be rewritten as

$$E\left(|B_i|\,|\Delta X\right) \approx \tau_1\sqrt{\frac{2}{\pi}}q_0\sigma_\eta + \tau_2\bar{r}\Delta X$$

Hence, as $N \to \infty$, from Khinchine's theorem (See Judge et al. 1988, and Gnedenko 1997), $p\lim(\Sigma_i\tilde{\eta}_i^2/N)=\sigma_\eta^2$, $p\lim(\Sigma_i\tilde{\eta}_i/N)=0$, and given the realisation $\tilde{X}_2-\tilde{X}_1$ $(=\Delta X)$, we obtain

$$p\lim \tilde{V}_2^2$$

$$= \frac{1}{4}\sum_i \frac{1}{r_i^2}\left[q_0^2\sigma_\eta^2 + \bar{r}^2(X_2 - X_1)^2\right] + \frac{1}{4}\sum_{i \neq j}\frac{1}{r_i r_j}\left(\tau_1\sqrt{\frac{2}{\pi}}q_0\sigma_\eta + \tau_2\bar{r}(X_2 - X_1)\right)^2$$

$$\equiv \left(\frac{J_1}{4} + \frac{J_2\tau_1^2}{2\pi}\right)q_0^2\sigma_\eta^2 + (\frac{J_1\bar{r}^2}{4} + \frac{J_2\tau_2^2\bar{r}^2}{4})(X_2 - X_1)^2 + \frac{J_2}{\sqrt{2\pi}}\tau_1\tau_2\bar{r}q_0\sigma_\eta(X_2 - X_1)$$

$$\equiv A_1 + A_2 + A_3 \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad \text{(A5)}$$

where

$$A_1 \equiv q_1 q_0^2\sigma_\eta^2 = q_1 Var\left(\frac{\left(\tilde{f}_{l2} - \tilde{f}_2\right)}{\sigma^2\left(\tilde{F}|I_{l2}\right)} - \frac{\left(\tilde{f}_{l1} - \tilde{f}_1\right)}{\sigma^2\left(\tilde{P}|I_{l1}\right)}\right)$$

$$A_2 \equiv q_2\bar{r}^2(X_2 - X_1)^2$$

$$= q_2\bar{r}^2\left[\left(\frac{\alpha_0}{\alpha_2} - \frac{\beta_0}{\beta_2} - \frac{\alpha_1 a_0}{\alpha_2 a_2} + \frac{\beta_1 a_0}{\beta_2 a_2} + \frac{\beta_3 b_0}{\beta_2 b_3} - \frac{\beta_3 b_2 a_0}{\beta_2 b_3 a_2}\right) + \left(\frac{1}{\beta_2} + \frac{\beta_3 b_1}{\beta_2 b_3}\right)P_2 + \left(-\frac{\beta_3}{\beta_2 b_3}\right)\tilde{f}_2\right.$$

$$\left. + \left(-\frac{1}{\alpha_2} - \frac{\alpha_1 a_1}{\alpha_2 a_2} + \frac{\beta_1 a_1}{\beta_2 a_2} - \frac{\beta_3 b_2 a_1}{\beta_3 b_3 a_2}\right)P_1 + \left(\frac{\alpha_1}{\alpha_2 a_2} - \frac{\beta_1}{\beta_2 a_2} + \frac{\beta_3 b_2}{\beta_2 b_3 a_2}\right)\tilde{f}_1\right]^2$$

Appendix 5 *(continued)*

$$= q_2 \bar{r}^2 \left(g_0 + g_1 P_2 + g_2 \bar{f}_2 + g_3 P_1 + g_4 \bar{f}_1 \right)^2$$

$$A_3 \equiv q_3 \bar{r} \left(X_2 - X_1 \right)$$

$$= q_3 \bar{r} \left(g_0 + g_1 P_2 + g_2 \bar{f}_2 + g_3 P_1 + g_4 \bar{f}_1 \right)$$

(A5) can be written as Equation (20).

Appendix 6: *Proof of Proposition 3*
From (25)

$$\tilde{V}_{n2}^2 = h^2 N^2 \left(\tilde{X}_2 - \tilde{X}_1 \right)^2$$

$$2 \tilde{V}_2 \tilde{V}_{n2} = 2 \left\{ \frac{1}{2} \sum \frac{1}{r_i} \left| \bar{r} \left(\tilde{X}_2 - \tilde{X}_1 \right) + q_0 \tilde{\eta}_i \right| \right\} \left\{ h N \left| \tilde{X}_2 - \tilde{X}_1 \right| \right\}$$

$$= h N \sum \frac{1}{r_i} \sum_i \left| \bar{r} \left(\tilde{X}_2 - \tilde{X}_1 \right) + q_0 \tilde{\eta}_i \right| \left| \tilde{X}_2 - \tilde{X}_1 \right|$$

As $N \rightarrow \infty$, $2 \tilde{V}_2 \tilde{V}_{n2}$ can be rewritten as

$$h N \sum \frac{1}{r_i} (\tau_1 \sqrt{\frac{2}{\pi}} q_0 \sigma_\eta + \tau_2 \bar{r} \Delta X) \left| \tilde{X}_2 - \tilde{X}_1 \right|$$

and its value is positive. Because $\tilde{V}_{total2}^2 = (\tilde{V}_2 + \tilde{V}_{n2})^2$, we also obtain that factors influencing total trading volume include the market price of the risky asset and the informed traders' individual expectations as well as the average expectation of its liquidating price in both periods. In addition, total trading volume is increasing with h.

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Factors associated with auditor changes: a Singapore study

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Abstract — The increasing concern over auditor independence makes auditor changes an important area of research. The purpose of this study is to identify the factors associated with auditor changes. The sample comprises 54 auditor-change SES (Stock Exchange of Singapore) companies and 54 non-auditor-change SES companies, matched by year and country of incorporation over a 10-year period from 1986 to 1995. Descriptive statistics and logit analysis are used to analyse the data and 16 auditor-change variables. The findings provide support to the belief that auditor changes are more likely in cases where firms engage smaller audit firms, change their management composition, experience a lower diffusion of ownership, experience an increase in income manipulation opportunities, have higher leverage, have many subsidiaries, or have more rapid growth. Further analysis also indicates that firm characteristics can explain the direction of auditor changes.

1. Introduction

This study aims to investigate the factors associated with auditor changes. With an auditor change, owners' and investors' confidence in the audited financial statements may diminish if they perceive negative connotations in the change and hence question auditor independence. A reduction in user confidence will not only defeat the purpose of auditing but will also undermine the credibility of the audit function. Furthermore, it can also inhibit the flow of capital in the securities markets and increase capital costs (Knapp and Elikai, 1988).

Wallace (1985) identified three related sources of demand for audits. The agency (stewardship) demand perceives an audit as a device that can reduce agency costs due to self-interested behaviour and information asymmetry. The information demand indicates that the selection of credible auditors signals management honesty and quality, and also reduces agency costs via the monitoring function. Finally, the insurance demand for audits suggests that investors and creditors (among others) are indemnified against financial losses through the auditors' professional liability exposure. Demand-side factors suggest that firm characteristics (e.g., agency-related factors such as firm size, leverage and management composition) determine the type of auditors selected, in terms of their qual-

ity and credibility (DeAngelo, 1981). However, the specific auditor selected is also influenced by supply-side factors (e.g., auditor characteristics such as auditor quality) and other factors (e.g., audit characteristics such as audit fee and audit opinion).

Existing studies on auditor changes relate mostly to the United States (US), the United Kingdom (UK) and Australia. Given the different environments across countries, it is useful to conduct an auditor-change study in Singapore, a developing and Asian country (Wallace, 1987). In addition to a different environment, this study considers the contingent nature of various auditor-change factors identified in the literature. No single factor or single array of organisational or environmental factors exists that represents an optimal inducement for all companies to make a certain strategic choice (e.g., an auditor change) (Ginsberg and Venkatraman, 1985). As there are no disclosure requirements for auditor changes in Singapore, it is important to determine the reasons companies change auditors in deciding whether to mandate disclosures. Further, having a greater understanding of the major determinants of auditor changes can enhance the credibility of the audit function. Finally, findings from the study can also facilitate the construction of auditor-change models.

Given the above, the objective of this study is to develop a model of auditor changes and examine the factors associated with auditor changes through an empirical test of the model developed. The major contribution of the study to the literature is the extension to the Singapore context of the existing work on auditor changes. In particular, it replicates previous studies using data from a different country. The paper consists of four sections. Section 2 discusses the research methodology em-

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ployed in the study and the relevant literature. Section 3 presents the results. Finally, the concluding section summarises the findings, presents the implications, highlights the limitations and suggests future research directions.

2. Research methodology

2.1. Research framework and model

Figure 1 presents the research framework, where the +/– sign shows the expected directional impact of each factor on auditor changes. As shown, factors associated with auditor changes can be classified into three major categories: audit and auditor characteristics, and firm characteristics. The logit model of auditor changes can be expressed as follows:

$$\hat{P}(AudChg=1)=F(b_0+\sum_{i=1}^{16}b_iX_i) \qquad (1)$$

where

$\hat{P}(AudChg=1)$ = estimated conditional probability of auditor change
$F(\ .\ )$ = cumulative logistic probability function
$X_1, ..., X_{16}$ = independent variables, AudFee to Issue (see discussion below)
$b_0, ..., b_{16}$ = model intercept and coefficients for independent variables X_i

In Model (1), the dependent variable is dichotomous (i.e., whether there is a change or no change in auditor). To further analyse auditor changes by incorporating their direction, the following multinomial logit model is estimated:

$$\hat{P}(AudChg=i)=F(b_0+\sum_{i=1}^{16}b_iX_i) \qquad (2)$$

where

$\hat{P}(AudChg=i)$ = estimated conditional probability of auditor change in a particular direction

(Discussion on the exclusion of AudQual in this model is deferred to a later section.)

Specifically for Model (2), the dependent variable (auditor change AudChg) is further classified as changes: (1) from a Big-6 audit firm to another Big-6 audit firm; (2) from a Big-6 audit firm to a non-Big-6 audit firm; (3) from a non-Big 6 audit firm to a Big-6 audit firm; and (4) from a non-Big-6 audit firm to another non-Big-6 audit firm. This enables the model to consider the direction of auditor changes. The terms 'auditor' and 'audit firm' are used interchangeably. The year of auditor change is defined as the year in which the new auditor takes on the audit engagement.

2.2. Audit and auditor characteristics
Audit Fee (AudFee)

Prior research has shown that audit fee is a determinant of auditor changes (see, for example, Pong and Whittington, 1994; Beattie and Fearnley, 1995, 1998a and 1998b; and Gregory and Collier,

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Figure 1
Research framework

Audit and auditor characteristics
• Audit fee (+)
• Audit opinion (+)
• Auditor quality (–)

Auditor change

Firm characteristics
• Management (+)
• Income manipulation opportunities (+)
• Leverage (+)
• Firm size (+)
• Complexity (+)
• Financial status (–)
• Firm growth (+)
• Financing activities (+)
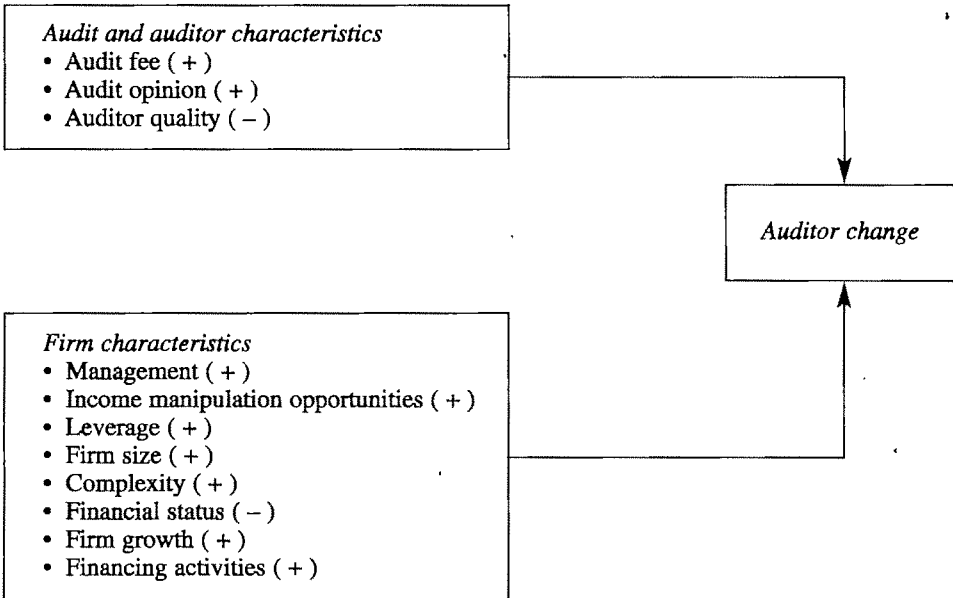
Note: The +/– sign indicates the expected directional impact.

1996). If a firm perceives that it can receive the same level of service for a lower audit fee, it will change to an auditor who charges less. In the study, audit fee (AudFee) is measured by the ratio of the preceding year's to the auditor-change year's audit fee.

Audit Opinion (AudOp)

Audit qualifications are perceived to have a negative effect on a firm's stock price (Chow and Rice, 1982) and its ability to borrow funds (Schwartz and Menon, 1985). Accordingly, a firm with a qualified opinion may change to other auditors. While Johnson and Lys (1990) and Krishnan, Krishnan and Stephens (1996) found that firms tend to change auditors after receiving a qualified opinion, Schwartz and Menon (1985) and Haskins and Williams (1990) did not find a significant relationship between auditor change and audit opinion. For the study, the audit opinion for the year preceding the auditor change (AudOp) is classified as either unqualified or qualified, taking a value of 0 or 1, respectively.

Auditor Quality (AudQual)

Researchers have suggested that firms demand a certain level of audit quality which depends on how closely management and owners' interests are aligned (Francis and Wilson, 1988; and DeFond, 1992). Because auditors specialise in the level of audit quality provided to clients, a change in the demand for a particular level of quality will lead to a change in auditors (Haskins and Williams, 1990). Further, Beattie and Fearnley (1995) reported that dissatisfaction with audit quality is one of the most common reasons cited for changing auditors. Auditor quality (AudQual) is measured in the study by using a dummy variable that is coded as 1 if the audit firm preceding the year of auditor change is a Big-6 audit firm and 0 otherwise. Generally, larger audit firms have more resources to provide a certain level of service and reduced incentive to lower audit quality opportunistically to retain any single client (DeAngelo, 1981).

2.3. Firm characteristics

Management (MgtComp, MgtOwn and LgOwn)

Carpenter and Strawser (1971) and Beattie and Fearnley (1995 and 1998b) found that changes in management are a significant factor in auditor changes. However, in the studies by Schwartz and Menon (1985) and Williams (1988), the results were not statistically significant. Also, DeFond (1992) found an association between changes in management stock ownership and the use of the then Big-8 auditors. Contrary to DeFond (1992), Francis and Wilson (1988) did not find statistically significant results. Diffusion of ownership may also affect the extent of owner-manager conflict (Alchian and Demsetz, 1972). Both Palmrose

(1984) and Francis and Wilson (1988) found diffusion of ownership to be a significant auditor-change factor.

In the study, change in management composition (MgtComp) is measured by a dummy variable taking on the value of 1 if there is a change in directors and 0 otherwise. A change in management ownership (MgtOwn, the second variable under the management factor) is measured by the change in the percentage of stock owned by managers and directors for the year prior to the auditor change. Diffusion is measured by the percentage of common stock owned by the largest single shareholder for the year preceding the auditor change (LgOwn). A larger percentage of common stock owned by the largest single shareholder indicates a lower diffusion of ownership.

Income Manipulation Opportunities (IncMani)

Healy (1985) suggested that short-term accruals are income determinants vulnerable to management manipulation. Given this, DeFond (1992) used short-term accruals as a surrogate for the extent of vulnerability to management manipulation (i.e., income manipulation opportunities) and hypothesised that the larger the relative size of short-term accruals, the greater the vulnerability to manipulations and therefore the greater the demand for higher quality audit firms. However, he found insufficient evidence to support the hypothesis. This study uses the relative size of short-term accruals (i.e., ratio of short-term accruals to total assets) for the year preceding auditor change as a surrogate for income manipulation opportunities (IncMani).

Leverage (Lev)

Jensen and Meckling (1976) suggested that managers and owners have the opportunities to transfer wealth from debt holders to themselves. As the amount of debt increases, the potential amount of wealth transfer increases, resulting in a greater incentive for managers and owners to transfer wealth. A more independent auditor is therefore needed to increase the reliability of accounting information used to verify covenant compliance. Leverage was found to be associated with the choice of Big-8 auditors by Eichenseher and Shields (1989) and Defond (1992). However, Palmrose (1984) and Healy and Lys (1986) found no significant association. In the study, leverage (Lev) is measured as the ratio of long-term debt (excluding deferred income taxes) to total assets for the year preceding auditor change.

Firm Size (FirmSize) and Complexity (Subsi and Ind)

Palmrose (1984) suggested that as a firm increases in size, the number of agency relationships also increases, making it more difficult for owners to monitor managers' actions or for debt holders to monitor managers' and owners' actions. This re-

sults in a greater need for auditor independence. Firm size was shown to be a significant auditor-change factor by Johnson and Lys (1990) and Haskins and Williams (1990). However, Schwartz and Menon's (1985) study failed to support a relationship between the size of failing firms and auditor changes.

As with size, the complexity of a firm increases the number of agency relationships and the remoteness of principals in observing the actions of agents, thus making it difficult to monitor the latter's behaviour. Palmrose (1984), by using the number of subsidiaries as a surrogate, showed that complexity and diversity are associated with auditor changes.

The square root of total assets (inflation-adjusted) is used to measure the size of a firm (FirmSize) in this study. Further, the complexity of a firm is reflected by its geographical dispersion as well as the number of industrial sectors that it operates in. As such, the number of subsidiaries and the number of different industrial sectors that the firm and its subsidiaries operate in are used to measure firm complexity (i.e., Subsi and Ind, respectively).

Financial status (Profit)

Prior research has shown that the economic condition of a firm is associated with auditor changes. With higher perceived audit and business risks, the incumbent auditor of a distressed firm will naturally increase audit procedures and apply more conservative accounting treatments or may even resign if he perceives that the audit risk is too high. Also, financially unsound firms may change auditors with the hope of receiving more favourable audit reports. Schwartz and Menon's (1985) study on auditor changes by failing firms indicated that financial distress is a significant auditor-change factor (see also Haskins and Williams, 1990). In the study, profitability (Profit, measured by return on assets) for the year preceding the auditor change is used to proxy for financial status.

Firm growth (Merger and Growth)

Rapid firm growth alters the economies of scale previously available to the incumbent auditor. A growing firm may thus need to change to an auditor who can better accommodate its expansion at a lower cost. Haskins and Williams (1990) and Johnson and Lys (1990) reported that the growth of a firm is associated with auditor changes. Further, mergers were found to be a significant auditor-change factor by Bedingfield and Loeb (1974) and Linbeck and Rogow (1978). Burton and Roberts (1967) and Chow and Rice (1982), however, did not find statistically significant results. In the study, firm growth relates to the ability of a firm to increase the scope, geographical dispersion and volume of its activities. Hence, existence of a merger, acquisition or joint venture

(Merger, measured by a dummy variable) and enterprise growth (Growth, measured by the percentage change in sales for the year preceding auditor change) are used as proxies for firm growth. (From hereon, the term 'merger' also includes acquisition and joint venture.)

Financing activities (ExchMem and Issue)

A firm has private information about its future prospects that is unavailable to investors. This information asymmetry may lead to a demand for credible auditors to signal firm value and minimise monitoring cost. Francis and Wilson (1988) and Johnson and Lys (1990) concluded that subsequent offerings of debt or equity securities are associated with changes in auditor size and brand name. However, no such evidence was detected by Healy and Lys (1986). In the context of stock exchange membership, Palmrose (1984) documented that because of different listing requirements, firms listed on the New York Stock Exchange (NYSE) differed in their auditor choice compared to those that were not listed on the NYSE.

Financing activities as defined in this study relate to the raising of capital through stock and/or debt issues. This variable is measured by: (1) the firm's membership with the Stock Exchange of Singapore on either the main board or secondary board (i.e., SES Dealing and Automated Quotation – SESDAQ), which is a dummy variable taking on the value of 1 if it is on the main board and 0 otherwise (ExchMem); and (2) the ratio of the proceeds of publicly issued stocks and debt in the year after the auditor change to the book value of assets at the beginning of the year (i.e., the year of auditor change) (Issue).

2.4. Comments on the current literature

Instead of looking at auditor changes in general, some recent studies have distinguished between auditor resignations and auditor dismissals and focused on auditor resignations.[1] In the local (Singapore) context, it is not feasible to pursue this line of research (that dichotomises auditor changes

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[1] For example, DeFond, Ettredge and Smith (1997), Krishnan and Krishnan (1997) and Raghunandan and Rama (1999) found that the characteristics of resignation companies and those of dismissal companies are significantly different. Also, Wells and Loudder (1997) and Dunn, Hillier and Marshall (1999) found that negative price reaction is associated with auditor resignations. Overall, auditor resignations are perceived to be more unfavourable and to have more unfavourable information content on companies than auditor dismissals.

[2] That is, while both auditor resignations and dismissals are technically possible, the dominant form of auditor change is resignations. Also, it is not possible to tell from published sources whether a particular auditor change is an auditor dismissal (in a more general sense) or an auditor resignation. In addition, auditor changes are rather uncommon in Singapore and it is not desirable to further partition the auditor-change sample.

into auditor resignations and auditor dismissals) as auditor dismissals (i.e., auditor removals as per the Singapore Companies Act) are practically non-existent.[2]

3. Results and implications

The study is conducted in Singapore, a developing and Asian country. Here, the Parliament is the most important and significant regulatory body of auditing. The Companies Act and Accountants Act affect several aspects of auditing, including the entry qualifications of auditors, the professional conduct and ethics of auditors, the conduct of audits, the contents of the auditors' reports and disciplinary actions against auditors. Generally, auditors in Singapore provide primarily assurance services, including the traditional financial statement audit as required by the Companies Act (See and Mock, 1999).

Under section 205(4) of the Singapore Companies Act, an auditor may be removed by resolution of the company at a general meeting of shareholders of which special notice (i.e., at least 28 days) has been given, providing auditors an opportunity to explain their position to shareholders. However, for auditor changes in general, there are no disclosure requirements on the auditors or firms. The Code of Professional Conduct and Ethics only requires the new auditor to communicate with the incumbent auditor before accepting the appointment. To ensure that the company auditor is independent of the company's management, every listed company must appoint an audit committee under Section 201B of the Companies Act.

3.1. Sample data and statistical methodology

For the study, the population of interest comprises all companies listed on the Stock Exchange of Singapore (SES) for the period 1986 to 1995. Two-thirds of the selected SES companies are incorpo-

rated in Singapore and the remaining in the neighbouring Malaysia. All data that are denominated in Malaysian ringgit are translated to their Singapore dollar equivalents for the purpose of the study. The accounting/auditing frameworks in Singapore and Malaysia are essentially the same, both being guided closely by international accounting/auditing standards (Ashari et al. 1994).

A matched-pair sampling design is used. Firms that changed auditors from the year 1986 to 1995 are identified from the SABRE Centre Financial Database and various issues of the *SES Handbook* as of 15 April 1997. The control group is selected from non-auditor-change SES companies as follows. All non-auditor-change companies matched to each auditor-change company by year and country of incorporation are first listed and then one of them is randomly selected for the control group. Other possible matching criteria such as total assets or profits are not used as they are already incorporated as independent variables in the study. (To test for robustness of the matched-pair sampling design, a second control group was selected and analysis re-performed. No material difference was found in the model results.)

The final sample consists of 54 control companies matched by year and country of incorporation and 54 experimental companies meeting the following criteria: (1) changed auditors between 1986 and 1995, and (2) registered on the main board or secondary board (SESDAQ) of SES as of the year of change. The percentage of auditor-change firms ranges from 0.97% (in 1995) to 4.21% (in 1990). The frequency of auditor changes among listed companies is very low in Singapore (54 from 1986 to 1995), especially as compared to the UK or US. For example, Beattie and Fearnley (1994) reported that a total of 341 companies out of 2,079 listed UK companies (i.e., 16.4%) changed their auditors at least once during the period 1987 to 1991 and DeFond (1992) reported

Table 1
Distribution of auditor changes by year

Year	Big-6 to Big-6	Big-6 to non-Big-6	Non-Big-6 to Big-6	Non-Big-6 to non-Big-6	Total
1986	0	1	2	1	4
1987	4	1	1	1	7
1988	4	1	3	2	10
1989	1	0	2	1	4
1990	8	0	0	0	8
1991	3	0	0	0	3
1992	3	1	3	0	7
1993	4	0	1	0	5
1994	3	0	0	0	3
1995	2	0	1	0	3
Total	32	4	13	5	54

Table 2
Descriptive statistics of sample companies

Panel A	Total sample (N=108)		Auditor-change (N=54)		Non-auditor-change (N=54)	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
AudFee	0.96	0.30	0.98	0.38	0.94	0.18
MgtOwn (%)	4.51	57.88	8.05	61.64	0.96	54.20
LgOwn (%)	36.20	19.84	39.94	20.58	32.46	18.52
IncMani	0.69	0.42	0.75	0.41	0.62	0.42
Lev	0.08	0.12	0.10	0.14	0.06	0.10
FirmSize ($)	15977.19	25857.86	13484.81	12957.17	18469.58	34195.42
Subsi	13.07	18.64	14.41	22.52	11.74	13.81
Ind	3.21	2.78	3.06	2.51	3.37	3.04
Profit	0.02	0.08	0.02	0.10	0.03	0.06
Growth (%)	19.82	92.81	32.83	124.25	6.81	40.08
Issue	0.10	0.90	0.20	1.27	0.01	0.05

Panel B		Total sample		Auditor-change		Non-auditor-change	
Variable		Frequency (%)		Frequency (%)		Frequency (%)	
AudOp	Qualified opinion	11	(10.20)	4	(7.40)	7	(13.00)
	Unqualified opinion	97	(89.80)	50	(92.60)	47	(87.00)
AudQual	Big-6 audit firm	79	(73.10)	36	(66.70)	43	(79.60)
	Non-Big-6 audit firm	29	(26.90)	18	(33.30)	11	(20.40)
MgtComp	Change in director appointment	48	(44.40)	31	(57.40)	17	(31.50)
	Otherwise	60	(55.60)	23	(42.60)	37	(68.50)
Merger	Merger/acquisition/joint venture	40	(37.00)	23	(42.60)	17	(31.50)
	Otherwise	68	(63.00)	31	(57.40)	37	(68.50)
ExchMem	Main board	98	(90.70)	49	(90.70)	49	(90.70)
	SESDAQ	10	(9.30)	5	(9.30)	5	(9.30)

AudFee	= Audit fee (preceding year's audit fee to auditor-change year's audit fee)
AudOp	= Audit opinion (1 for qualified; 0 otherwise)
AudQual	= Auditor quality (1 for Big-6; 0 otherwise)
MgtComp	= Management composition (1 for change in directors; 0 otherwise)
MgtOwn	= Management ownership (change in percentage of stock owned by managers and directors)
LgOwn	= Diffusion of ownership (percentage of stock owned by largest single shareholder)
IncMani	= Income manipulation opportunities (short-term accruals to total assets)
Lev	= Leverage (long-term debt to total assets)
FirmSize	= Firm size (square root of inflation-adjusted total assets)
Subsi	= Complexity (number of subsidiaries)
Ind	= Complexity (number of industrial sectors)
Profit	= Financial status (return on assets)
Merger	= Firm growth (1 for existence of merger, acquisition or joint venture; 0 otherwise)
Growth	= Growth (percentage change in sales)
ExchMem	= Financing activities (1 for membership with main board; 0 otherwise)
Issue	= Financing activities (proceeds of stocks and debt issued to total assets)

that 1,861 listed US companies changed their auditors between 1979 and early 1983.

The sample of auditor-change firms is further classified as changes: (1) from a Big-6 to another Big-6; (2) from a Big-6 to a non-Big-6; (3) from a non-Big-6 to a Big-6; and (4) from a non-Big-6 to another non-Big-6. This classification considers the direction of the auditor changes. The distribution of these changes is given in Table 1. Further, the descriptive statistics for the 108 sample companies are presented in total and separately in Table 2. These statistics facilitate interpreting the effects of significant independent variables in the logit model and are hence discussed together with the multivariate test results.

It is noted that the study may be limited by the small sample size of 108 sample companies and the uneven distribution of the sample companies across the different directions of auditor changes (e.g., only four sample companies changed from a Big-6 to a non-Big-6 while 32 sample companies changed from a Big-6 to another Big-6). It is envisaged that these data limitations may render the statistical tests less powerful and the results less significant.

Logit analysis is performed on the sample data as follows. For Model (1), a logit model is constructed to predict auditor-changes versus non-auditor-changes using the Logistic procedure in the Statistical Analysis Software (SAS Institute, 1990). The auditor-change status (a dichotomous variable) is the dependent variable and the 16 auditor-change variables are the independent variables. The results are summarised in Table 3 (Panel A), which shows the estimated model coefficients, the associated significance test results and the model holdout accuracy rates. The holdout accuracy rates are computed using the jack-knife approach to reduce the bias of classifying the same sample data. With this approach, a logit model is first constructed based on (n-1) observations and the resulting model is then applied to the heldout observation. The classification result is noted. This process is repeated n times (until every observation has the chance to be the heldout observation) and the holdout accuracy rates are computed over the n heldout observations.

For Model (2), a multinomial logit model is constructed to predict the direction of auditor changes using the Catmode procedure in the Statistical Analysis Software (SAS Institute, 1990; Allison, 1999). The direction of auditor changes (as defined earlier) is the dependent variable. It is noted that AudQual (measured as Big-6 versus non-Big-6) is no longer applicable in the multinomial logit model because it is now incorporated into the dependent variable. Hence, the remaining 15 auditor-change variables are the independent variables. For this analysis, the change from a non-Big-6 to a

Big-6 is taken to be the reference group. The results are summarised in Table 3 (Panel B), which shows the estimated model coefficients and associated significance test results.

3.2. Logit analysis results

As can be seen from Panel A of Table 3, the logit model is significant with a p-value of 0.0001, indicating a good fit. Also, the logit model correctly classifies 67.59% (i.e., 73) of the 108 firms in the sample. This overall holdout accuracy rate is consistent with prior studies and can be deemed adequate. For instance, Williams's (1988) contingent model of auditor changes has an accuracy rate of 66.13% and in the local context, Choo and Koh (1989) studied the association of financial ratios with auditor changes and reported an accuracy rate of only 54.17%. The p-values in Table 3 show that nine variables, corresponding to seven factors, are significant at the 5% significance level (one-tailed tests). It is also noted that the model intercept is significant with a p-value of 0.0386 (two-tailed since there is no directional expectation). For the purpose of this study, however, the intercept is not relevant to the research framework and can be interpreted as an adjustment term to improve the predictive ability of the logit model. Alternatively, the intercept may be interpreted as capturing any bias introduced by the matched-pair sampling design used in the study. It is noted that this bias may affect the reliability of the model predictions.

Audit and auditor characteristics

The variable AudOp (p-value = 0.0313) is significant but the coefficient possesses a negative sign (i.e., a qualified opinion is associated with a lower probability of auditor change), which is inconsistent with what is expected. Further investigation found that the seven firms that did not change auditors upon the receipt of an audit qualification (see Table 2) had their audit opinions qualified for matters which are material but not of fundamental importance (five received 'subject to' qualified opinion and two received 'except for' qualified opinion). In contrast, for auditor-change firms, only two received 'subject to' qualified opinions while the other two received audit qualifications that are related to matters that are not only material but also of fundamental importance. In particular, one firm received a disclaimer of opinion while another firm received an adverse opinion. It may be speculated that firms that receive audit qualifications change auditors only if the qualifications relate to material matter of fundamental importance. However, the sample is too small (only 11 firms received audit qualifications) to make any general conclusion. Mixed findings have also been reported in the literature (e.g., Krishnan et al. (1996) versus Haskins and Williams (1990)).

Table 3
Logit analysis results (N=108)

Panel A – Logit model results

Variable	Predicted sign	Coefficient	Chi-square	p-value*
Model			52.30	0.0001
Intercept		–4.14	4.28	#0.0386
AudFee	+	1.58	2.04	0.0766
AudOp	+	–1.94	3.47	#0.0313
AudQual	–	–2.48	9.94	#0.0008
MgtComp	+	1.47	6.37	#0.0058
MgtOwn	+	0.01	2.50	0.0571
LgOwn	+	0.05	8.20	#0.0021
IncMani	+	1.59	5.43	#0.0099
Lev	+	5.42	3.11	#0.0389
FirmSize	+	0.00	1.89	0.0849
Subsi	+	0.08	5.08	#0.0121
Ind	+	–0.31	5.08	#0.0121
Profit	–	–4.56	1.39	0.1194
Merger	+	1.81	6.24	#0.0062
Growth	+	0.01	0.35	0.2771
ExchMem	+	0.36	0.11	0.3729
Issue	+	0.71	0.03	0.4303

Note: See Table 2 for the definition of the variable abbreviations.
*   One-tailed tests of the independent variables (i.e., except the intercept).
#   Significant at a 5% level of statistical significance.

Classification results (holdout accuracy rates)

Actual status	Predicted status		Total
	Auditor-change	Non-auditor-change	
Auditor-change	39 (72.22%)	15 (27.78%)	54
Non-auditor-change	20 (37.03%)	34 (62.96%)	54
Total	59	49	108
Overall Accuracy Rate			67.59%

Panel B – Direction of auditor changes

Variable	From B to B versus From Non-B to B		From B/Non-B to Non-B versus From Non-B to B	
	Coefficient	p-value	Coefficient	p-value
Intercept	–1.64	0.4858	6.08	0.0705
AudFee	–0.33	0.7839	–2.35	0.2812
AudOp	0.21	0.8030	–0.06	0.9401
MgtComp	0.44	0.3487	0.78	0.1856
MgtOwn	0.02	0.1239	0.01	0.3518
LgOwn	0.09	0.0043#	0.02	0.6752
IncMani	–0.55	0.6445	–2.77	0.0773
Lev	–0.44	0.8939	–9.78	0.1073
FirmSize	0.00	0.7827	–0.01	0.0253#
Subsi	0.09	0.1404	0.10	0.1336
Ind	–0.17	0.4780	0.01	0.9849
Profit	–3.01	0.5179	–1.52	0.7792
Merger	–0.25	0.5699	0.32	0.5923
Growth	–0.01	0.0479#	–0.01	0.2245

Note: See Table 2 for the definition of the variable abbreviations.
Note: The independent variables ExchMem and Issue cannot be assessed because of complete separation problems.
Significant at a 5% level of statistical significance.
B   = Big-6 audit firm
Non-B = Non-Big-6 audit firm

Another significant auditor-change factor is AudQual (p-value = 0.0008). The coefficient has an expected negative sign, indicating that a higher probability of auditor changes is associated with non-Big-6 audit firms (see also Table 2). This finding is consistent with firms demanding a higher level of audit quality as well as prior studies such as Haskins and Williams (1990), DeFond (1992) and Beattie and Fearnley (1995, 1998a and 1998b).

It is noted that AudFee is close to statistical significance at a 5% level (p-value = 0.0766). As expected, the positive coefficient suggests that higher audit fees are associated with auditor changes.

Firm characteristics

Two surrogates of management, namely MgtComp (p-value = 0.0058) and LgOwn (p-value = 0.0021), are significant. In addition, the signs of MgtComp and LgOwn are both in the expected direction (i.e., positive). Therefore, it can be concluded that changes in management composition and a lower diffusion of ownership are associated with a higher probability of auditor change. This finding is also reflected in the descriptive statistics (see Table 2) and is consistent with Francis and Wilson (1988), DeFond (1992) and Beattie and Fearnley (1995, 1998a and 1998b).

IncMani (p-value = 0.0099) is also significant. The sign of the coefficient (+) indicates that a higher level of income manipulation opportunities is associated with a higher probability of auditor change. In contrast, DeFond (1992) was not able to find significance for IncMani in his study. Another significant firm characteristic is Lev (p-value = 0.0389). As expected, the higher the leverage, the higher the probability of auditor changes. This finding is also reported by Eichenseher and Shields (1989) and DeFond (1992).

As for the auditor-change factor 'complexity', both Subsi (p-value = 0.0121) and Ind (p-value = 0.0121) are significant. The positive sign for Subsi indicates that the larger the number of subsidiaries a firm has (i.e., the higher the level of firm complexity), the higher the probability of auditor change (Palmrose, 1984). However, the negative sign for Ind is contrary to expectation (see also Table 2). Hence, there is conflicting evidence for firm complexity.

Finally, Merger (p-value=0062) is significant and the expected positive coefficient indicates that firm growth (at least in terms of mergers) is associated with auditor changes. This finding is consistent with Linbeck and Rogow (1978).

3.3. Direction of auditor changes

The direction of auditor changes can be investigated within the framework proposed by Healy and Lys (1986) and further developed by Francis and Wilson (1988) and Johnson and Lys (1990).

As postulated by the framework, Big-6 audit firms are better able to capitalise on economies of scale to provide specialised services (e.g., audits across different geographical regions, computer audits, tax services and management services) at a lower cost than can non-Big-6 audit firms. Further, with larger investments in brand names, Big-6 audit firms (vis-à-vis non-Big-6 audit firms) have brand names that can signal higher audit quality.

Such a framework suggests that some auditor-change factors do specify the direction of auditor changes. For example, when a firm grows and becomes more complex or when there are management changes that increase agency costs, a firm may change from a non-Big-6 audit firm to a Big-6 audit firm to gain access to specialised services and/or enhanced auditor reputation. On the other hand, some auditor-change factors do not specify the direction of auditor changes. For example, when audit fee is perceived to be high or when the audit opinion received is perceived to be unfavourable, a firm may change to another auditor regardless of whether this auditor is a Big-6 or non-Big-6 audit firm.

To investigate this further, auditor changes are classified according to their direction as discussed earlier. As shown in Table 1, most of the auditor changes in the sample relate to changes from a Big-6 to another Big-6 (32 out of 54) and from a non-Big-6 to a Big-6 (13). Given their small numbers, changes from Big-6 to a non-Big-6 (4) and from a non-Big-6 to another non-Big-6 (5) are combined into a single group. The multinomial logit analysis results that consider the direction of auditor changes are summarised in Panel B of Table 3. The study focuses on changes from a non-Big-6 to a Big-6 relative to the other auditor changes.

As can be seen, three variables are significant at a 5% significance level: LgOwn (p-value=0.0043), FirmSize (p-value = 0.0253) and Growth (p-value = 0.0479). The numerical sign of the coefficients suggests that firms change from a non-Big-6 audit firm to a Big-6 audit firm when there is diffusion of ownership (LgOwn) as well as more agency relationships (FirmSize), and when they grow (Growth). These findings are consistent with expectations and with prior studies. For example, Johnson and Lys (1990) reported that their study and other prior studies have produced two consistent results: client size and asset growth both exhibit significant positive associations with changes to larger audit firms. Further, Francis and Wilson (1988) found that diffusion of ownership is significantly related to the direction of auditor change, as specified in an agency setting. That is, as agency costs increase, companies are more likely to change to a Big-6 audit firm.

Compared to the earlier logit analysis results, as expected audit opinion (AudOp) is not significant

in the multinomial logit model (p-value > 0.8000). This is consistent with the belief that a firm with an unfavourable audit opinion may change to another auditor regardless of whether this auditor is a Big-6 or non-Big-6. It is also noted that several agency-related auditor-change factors are found to be significant in the logit analysis model but not in the multinomial logit analysis model. A possible explanation is that the latter results are less powerful because of the classification of the sample auditor-change firms into more groups. Nevertheless, some of these variables are close to statistical significance (see, for example, IncMani (p-value = 0.0773) and Lev (p-value = 0.1073)). Thus, the logit and multinomial logit analyses results are consistent and complementary.

4. Conclusion

The objective of this study is to identify the factors associated with auditor changes. It extends to the Singapore context the existing work on auditor changes. Overall, the findings of this study are consistent with those of prior studies. In particular, logit analysis results indicate that audit opinion, auditor quality, management changes, income manipulation opportunities, leverage, complexity and firm growth are significant auditor-change factors. Apart from audit opinion and the number of industrial sectors as a measure of firm complexity, the logit analysis results directly support the expectations put forward in the study. Further, the multinomial logit analysis results provide some evidence that firm characteristics affect the direction of auditor changes.

Several conclusions can be drawn from the study. First, the incidence of auditor changes is greater among firms engaging smaller audit firms. Small audit firms generally have less resources and are perceived to provide a lower audit quality than the Big-6 (DeFond, 1992). Hence, firms engaging small audit firms may change auditors when the incumbent auditors are not capable of meeting their needs. Second, firms that have changes in management composition or that have a lower diffusion of ownership are more likely to change auditors. It is noted that the contracting environment of a firm changes when there are changes in management composition; hence the subsequent auditor changes (especially to a higher audit quality).

Third, firms have a greater propensity to change auditors when they have more income manipulation opportunities. The more the income manipulation opportunities, the greater the demand for monitoring. One solution is to engage auditors who are more independent. Fourth, firms with higher leverage have greater opportunities and incentives for managers and owners to transfer wealth from debt holders to themselves. It is found

in the study that auditor changes are more common among firms with higher leverage.

Fifth, firms that are more complex change auditors more often than those that are not. As the number of subsidiaries increases, the incumbent audit firm may be incapable of handling the complex and huge volume of activities, or may be able to do so only with a substantial increase in audit fees. These companies may thus change to audit firms who can offer their audit services competently and competitively. Sixth, growing firms are more inclined to change auditors. Rapid firm growth alters the economies of scale previously available to the incumbent auditors, who may now not be able to accommodate the expansion at acceptable costs. Again, the direction of change is likely to be from a non-Big-6 to a Big-6. Finally, the findings indicate that firm characteristics can affect the direction of auditor changes. Overall, the findings are consistent with expectations and with those of prior studies.

It is also noted that the study expects a qualified opinion to be associated with a higher probability of auditor change. However, it is found that a qualified opinion is associated with a lower probability of auditor change. Further analysis suggests that the sample size is too small for any general conclusion. In addition, the finding relating to the number of industrial sectors (a measure of firm complexity) is contrary to expectation.

The above findings suggest that an auditor change is often an outcome of various legitimate factors. However, financial statement users should be aware that illegitimate factors (e.g., opinion shopping) may also lead to auditor changes. Perhaps regulatory authorities should develop an auditor-change policy that prevents illegitimate motives for auditor changes but which at the same time does not discourage legitimate auditor changes.

Some potential limitations should be considered when interpreting the results of the study. The first concerns the restrictive interpretation of associative relationships. Although statistically significant relationships are found between nine independent variables and auditor changes (Panel A of Table 3), a causal relationship should not be assumed.

Second, the quality of the results depends on the quality of the sample data. This study does not include all SES companies as only companies whose data are captured by the SABRE Centre Financial Database or the SES library as at 15 April 1997 are considered. There is a possibility that some auditor-change companies may be excluded from the study, and the characteristics of the sample companies may be different from those of the excluded companies. Therefore, the results are valid only to the extent that the sample is representative of

the population (i.e., the external validity issue). This limitation, however, is not expected to be serious as only about 15% of SES companies are not covered. There is no a priori expectation of any directional bias.

Also on the quality of the sample data, it is noted that the study relies primarily on published accounts. Thus, the validity of the study depends very much on the validity of the data contained in the published accounts and the credibility of the management involved. Further, the sample size (54 auditor changes) is relatively small and this limits the statistical power of the tests. In particular, the finding of an unexpected sign for audit opinion and the subsequent further analysis are based only on a total of 11 qualified opinions (four for auditor changes and seven for non-auditor-changes).

Third, besides population validity, ecological validity may also be affected in that the study is based only on companies listed on the Stock Exchange of Singapore. Hence, the findings may be inapplicable in other settings or situations. However, previous studies dealt mostly with companies in developed and Western countries such as the US and the UK. Thus, this may not necessarily be a limitation because the findings from an economically different (i.e., developing) and a culturally different (i.e., Asian) country may contribute towards the literature on auditor changes.

Finally, the independent variables included in the auditor-change model are not exhaustive. For example, reporting disputes (DeFond and Jiambalvo, 1993), opinion shopping (Mangold, 1985), audit firm size (Addams and Davis, 1994), audit firm reputation (Simunic and Stein, 1987), client firm reputation (Williams, 1988), and the demand for additional audit/non-audit services (Butterworth and Houghton, 1995) are potential determinants of auditor changes. These variables are not included in the study primarily because they are difficult to measure reliably and/or independently. Further, the small sample size necessitates the need to limit the number of independent variables included in the logit model.

Following the limitations highlighted above, future research can examine the issue of auditor changes in different contexts (such as different economic cycles or different stock exchanges). Further, other potential auditor-change determinants can be included to derive a more comprehensive auditor-change model. In addition, future research can explore the roles played by management and shareholders in the auditor selection decision. Such findings, together with the statistical results, can form a better basis for policy makers to determine the necessity of regulatory intervention in auditor changes. Future research on stock market reaction to a change in auditor can also further

aid regulatory authorities in the decision with respect to mandatory disclosures when firms change auditors. Lastly, the inclusion of behavioural factors (as in the Beattie and Fearnley studies) provides another important avenue for future research.

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The over-riding importance of internationalism: a reply to Nobes

David Alexander*

'I deal with the truth. I leave facts to subordinates': caption from 3i calendar, 1995

1. Introduction

Nobes (2000) makes or emphasises distinctions not clearly segregated in Alexander (1999) and therefore adds usefully to the debate. He argues that Type C rules (detailed regulation) should prevail for preparers and auditors, and that Type A (a general over-riding requirement) should prevail for regulators. In relation to the latter point, Nobes points out (p.309) that it is not necessary for a Type A criterion to be enshrined in legislation for it to be employed by a regulator. This is correct. He also suggests, however, that where there are two levels of regulation (e.g. law and standards) then a true and fair over-ride may in certain circumstances be 'useful' (p.311 point c). This matter has important implications in the international context, developed below.

2. The Nobes arguments

Much of the earlier part of Nobes' Section 2 is valid and helpful. Then in Section 2.2 on p.308 he states that 'English-speaking regulators have reached the opinion (explicitly or otherwise) that .... Type A criteria in law should not outrank Type C rules in Standards *for preparers*' (emphasis original). In the UK context (which is Nobes' own heading for this section), this is not 'explicit', so is presumably claimed to be 'otherwise'. Rhetoric and the position and actions of the Financial Reporting Review Panel (FRRP) (Hines et al. 1999) suggest that the ASB may seek to give this *impression*, but that is not the same thing as saying that the regulators (a general term embracing at

least both government and standard-setter) have 'reached the opinion'.

However, as Nobes points out, the ASB in FRED 21 (ASB 1999) proposes to introduce its own explicit over-ride of its standards. He suggests (Section 2.3) that this is 'unlikely to be of practical use because of counsel's opinion that compliance [with the detailed rules of standards] would probably be held to be necessary in general in order to give a TFV'. (This is clearly a fair representation of counsel's view (Arden 1993), which refers to an 'increase [in] the likelihood ... that the Courts will hold that in general ...'.) The conclusion is not, however, accepted. Firstly, the over-ride applies in "exceptional" situations (Fourth Directive, article 2; Companies Act 1985, section 226; FRED 21, para.13; compare IAS 1, para.13: 'extremely rare') which is obviously fully consistent with the proposition that it will not be applicable 'in general'. Secondly, even if UK standard-setters did take the view that standards *must* be followed, there is clear evidence that UK auditors do not. The law unequivocally requires the auditor, not the standard-setter, to form and express an opinion on whether or not a TFV is given in any particular case. Examples exist to indicate that auditors have no objection in principle to the Type A criterion in law out-ranking Type C rules in laws or standards, for preparers (*Company Reporting* 1997).

It is perhaps more interesting to ask why the ASB proposes to introduce the over-ride in the standards, given that the over-ride in the law is already all-embracing and without limit. In this sense, though not for the reason he suggests, Nobes would seem to be correct in suggesting that the over-ride in the standards 'is unlikely to be of practical use'. This suggests that its proposed introduction is essentially for signalling purposes, to show support for IAS 1, and perhaps also to confirm that the FRRP should not be seen as an unthinking enforcer of rules. Putting these points together, it is clear to this author that the UK over-ride in the law, with or without any statement in Standards, does provide the possible over-ride for preparers which is unavailable in general international terms unless the IASC provides it.

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Nobes now turns to the international context, generally in his Section 3, and giving specific illustrations in his Section 4. The crucial difference between Nobes and myself is encapsulated on his page 309. He states that 'a Type A over-ride in IAS 1 will be interpreted with even more variance internationally than nationally, so that Type C rules will be over-ridden to different degrees and in different ways in different places even in similar circumstances. Users of sets of financial statements prepared in different countries but all under IAS rules would presumably prefer to reduce such differences'. His first sentence is correct and his second sentence is an intuitively sensible presumption. Nobes uses this as an argument against a Type A over-ride in IAS 1. But it has exactly the opposite implications. This is because differences are inevitable, as argued below. It is in the nature of the accounting function, and in the nature of the international environment, that rules – of all types and all levels – will be interpreted differently. It is also in the nature of the accounting function, and in the nature of the international environment, that rules, especially international rules, will *need* to be interpreted differently if they are to present local situations fairly. The way forward is to recognise this reality both conceptually and in practice, and to work within it, not to try and regulate it out of sight.

The objects of accounting, i.e. that of which we are seeking to give a fair representation, are a part of economic reality. However, 'economic reality' is an intersubjective construction, involved in a reflexive relationship with those who attempt to perceive it (Shapiro, 1997, 1998; Alexander and Archer, 1999). It follows in the general case that different communities which have different characteristics may inter-subjectively construct 'economic reality' differently. The accounting function is intimately bound up with human values, and whether or not any particular rules are just, or sensible, is a substantive moral issue, not a purely procedural question. Returning to Nobes p. 309, rules *at all levels* (not just a Type A over-ride) are liable to be interpreted in different ways in different places even in apparently similar circumstances. So will words, and so will numbers. This cannot be prevented except, literally, by brain-washing. The question is not: how do we prevent this? but rather, how can we best try to live with it?

3. Some examples

A simple example of the use of the over-ride by a preparer is given in *Company Reporting* (1997). This concerns the financial statements of Macro 4 plc for the year to 30 June 1996. The Notes to the accounts include the following statement.

'The board has placed certain of the company's funds with it's (sic) merchant bankers, who,

within laid down guidelines, have discretion to manage the funds to the best advantage of the shareholders. UK Treasury Index-Linked Gilts were held as current trading assets and were stated at market value and profits and losses arising from this valuation were taken to the Profit and Loss Account. This is not in accordance with Schedule 4 to the companies Act 1985, which requires that such assets be stated at the lower of cost and net realisable value or that if revalued any revaluation differences be taken to revaluation reserve. The board consider that these requirements would fail to give a true and fair view of the profit for the year of the company since the marketability of the investments enables decisions to be taken continually about whether to hold or sell them, and hence the economic measure of profit in any period is properly made by reference to market values.'

The trend since then by regulators the world over towards an increasing acceptance of fair value accounting, would seem to support the auditor's acceptance of this treatment.

Nobes states (p. 311) that US standard-setters do meet his point b on that page, i.e. that a Type A criterion is used when making Type C rules, although he suggests in his final paragraph that 'using' it does not imply taking it to its logical conclusion. However, consider the stock option compensation furore surrounding FAS 123 (see Alexander and Archer (1999), Williams (1999) and Zeff (1997)).

The FASB proposed a new Standard, FAS 123, to replace the previous GAAP promulgated in APB 25. The proposals would have required the benefit gained by employees through the receipt of stock options to be treated as an expense in the financial statements of the company. The difference in terms of reported profits over time could be startling. Following an outcry from commercial enterprises (preparers), and blatant political pressure and interference, the FASB was forced to make FAS 123 optional. The argument that prevailed was based on a supposed economic consequence of reporting such compensation as an expense. This was that numerous small, rapidly growing and cash-constrained companies, for which generous stock option plans were a vital means of compensating their key personnel without using cash they did not have, would report seriously worsened profitability if this compensation had to be accounted for as an expense in the income statement, to such an extent that their future could be jeopardised. But of course it *is* an expense. It is a straightforward transfer of wealth to employees in return for their services.

The result, surely, is that preparers have been allowed to define, in effect, their own choice of Type C rules either in the absence of a Type A rule, or in defiance of and contrary to the Type A rule if there is one. This does not seem consistent with Nobes' b on p. 311, and neither, under any rational meaning, is it consistent with fair presentation.

Of itself, the FAS 123 fiasco does not directly suggest support for either Nobes (2000) or Alexander (1999). Nobes suggests that, while fair presentation is agreed not to be an over-riding meta-rule for preparers in the US, there are 'other statements of purpose (i.e. Type A criteria) in the FASB's Framework' (footnote 13). This seems intuitively correct and some form of NTBM (not to be misleading) non-over-riding meta-rule can be plausibly postulated in the US context. However, in the FAS 123 case, any such meta-rule clearly failed to be used.

It is theoretically an open question as to whether a formally declared and very visible over-ride in the US, whether in law over SEC/FASB's Framework/Standards or over preparers, or in the FASB's Framework/Standards over preparers, would, by one route or the other, have prevented such an obvious avoidance of fair presentation and denial of NTBM as the fate of FAS 123 achieved. It is postulated here that the invalidity of the (successful) interference that actually took place would have been much more transparent and obvious, and therefore less likely to succeed, if a formal over-ride had been available, at *any* level.

Another case which clearly involves the over-ride is that of Coillte Teoranta – The Irish Forestry Board Limited, written up at length in McBride (1997). This state-owned private limited company owns 8% of the entire land mass of the Irish Republic and its core trading asset is its growing forests, which mature over a cycle of some 40 years. It reports, obviously, in accordance with Irish Company Law, which does not differ significantly from UK Company Law in any relevant respects. The (UK) ASB Standards are, by voluntary agreement, automatically applicable in the Republic, including all (UK) UITF pronouncements. The FRRP, however, has no jurisdiction in the Irish Republic, and no local body has been created to carry out its function.

From its inception in 1989, through to 1992, Coillte revalued its forest asset prudently each year, to reflect physical growth, and reported annual profits which included all forest growth realised through sales in the year, even though much of this would have been recognised previously in the balance sheet through the capital growth reserve. Coillte published a non-statutory 'statement of increase in forest asset' each year giving comprehensive details of these movements, and won prizes from the Institute of Chartered Accountants in Ireland for the quality of its published accounts.

From 1993, FRS 3 no longer permitted this practice, requiring that the recognised gains be included in the *Statement of Total Recognised Gains and Losses*, and that such gains could not be again recognised, as realised, in the profit and loss statement when the trees were sold. In its 1993 finan-

cial statements Coillte ignored FRS 3 and continued its previous policy, arguing that (as quoted by McBride 1997: 72):

> 'The accounting policies adopted recognise the *unusual nature* of the forestry industry and properly reflect the Group's profitability in the profit and loss account and the value of the forest asset in the balance sheet' (emphasis added by this author).

A UITF statement early in 1995 confirmed the requirement to follow FRS 3 and the response of Coillte was to revert to historical cost accounting for the 1994 financial statements. In effect, the company was forced to choose, as it saw it, between giving a true and fair view in the profit and loss account, by including all gains realised in the year, or giving a true and fair view in the balance sheet, by including the unrealised gains through growth in the forest core trading asset. It chose the former. This is, of course, not inconsistent with FRS 3, but it is inconsistent with the details of the UITF statement (for which, it will be recalled, no enforcement mechanism existed in Ireland). The effect of the failure to recognise growth in the balance sheet was mitigated in practice, but not obviated in theory, by the additional Statement of Increase in Forest Asset which continued to show the results of annual revaluations.

McBride discusses the implications at length, and is sympathetic to a) the original Coillte policy and b) the failure to follow the UITF statement in the post-FRS 3 period. He clearly implies that the absence in Ireland of an FRRP process to enforce the UITF statement has proved beneficial in this case. Perhaps, on post hoc reflection, they should have ignored FRS 3 as well, and maintained the original policy.

Once again, it can be suggested that individual actions may have been early signposts and harbingers of progress. The IASC draft for an international standard on agriculture, E65 (IASC 1999: 23) proposes that:

> 'Biological assets should be measured at each balance sheet date at their fair value.'

> 'The change in fair value of biological assets during a period should be recognised in net profit or loss for the period as part of profit or loss from operating activities.'

This in a sense goes further than Coillte did (and avoids the recycling problem) by immediately crediting all the gains to the income statement. E65 Example 2 gives a detailed illustration for a forestry enterprise, which describes the cumulative balance sheet number, including all changes in biological asset fair values, as 'retained earnings' (p.52) and 'accumulated profits' (p.51).

It is suggested in the above individual examples that the flexibility implied by a Type A over-ride can not only increase relevance, but also stimulate

progression in both practice and Type C regulation. The same argument applies to the two examples of Type A/ Type C conflict at a more general level which Nobes gives in his Section 4. Suggestions that existing type C rules (IASs in Nobes' examples) are 'wrong' need to be publicised and discussed. Nobes infers that the criticisms of IAS 12 on deferred tax which he cites are well-founded, but that the cited criticisms of IAS 19 on pensions may be 'mistaken'. Such propositions require theoretical appraisal, and possibly practical experimentation, via some authoritative court-of-appeal type monitoring system which is alive to the implications of the reflexive nature of the accounting function. If Nobes' inferences are valid, then such developments would generate validity and progress in the deferred tax example, and prevent invalid inconsistency in the pensions example. An over-ride principle, coupled with a truly effective monitoring system, would facilitate this whole process.

I should make it clear that I do not suggest that such a truly effective monitoring system currently exists. This is one of the key issues rightly raised by the SEC in its *Concept Release on International Accounting Standards* (SEC 2000). See, for example, the paragraphs relating to its Questions 15 and 16, which suggest that quality control standards of accountants and auditors must 'ensure application of the IASC standards in a consistent fashion worldwide'. I am suggesting here that an effective monitoring process is both necessary, and would be particularly beneficial in achieving progressive development when coupled with the freedom to suggest relevant innovations and improvements, for submission to the monitoring process, at the operational level.

4. Towards conclusions

Nobes considers the conclusion of his arguments primarily in relation to IAS 1. It must be remembered that the IASC, uniquely among standard-setters, necessarily has to operate and exist in a legal vacuum, or more accurately in uncontrolled and highly variable legal environments. There is no international company law comparable to UK law or US law or German law. Nobes is happy with his a, b and c on p. 311, i.e. that a Type A criterion 'should be used' (b) and is 'useful' (a) and that an element (restricted in Nobes' proposal) of over-ride is 'useful' (c).

But IAS 1 can make *no assumptions whatever* about the particular legal scenario in which it is to be applied. If it is agreed that a formal metarule and an element of over-ride is necessary as part of the system, then IASC will have to supply its own. And Nobes clearly believes that it is an important part of the system.

It is time to take stock. First, it is agreed that a meta-rule criterion of some kind is important.

Second, it should be an over-ride for those who create the Type C rules. This latter point presupposes that there are different levels of rule-maker within the relevant jurisdiction – eg that the law specifies the meta-rule, within which the lower-order standard-setter has to operate. Nobes is correct to say (p.309) that this meta-rule need not be 'enshrined in regulation as over-riding'. Alexander (1999) was wrong in this respect. But it must be available, and it must be used. The law, or the local political environment, must not have the possibility of preventing it being used, whether by overt or covert means. Perhaps the problem FASB (and SEC?) faced with the stock option debacle is the lack of an explicit effective over-ride enshrined in American law. If, in some parts of the world, local law is unable or unwilling to provide it, IASC is surely conceptually right to do so itself. If 'supremacy of a Type A criterion is necessary ... in the minds of the regulators' (Nobes p.311) the law, or a statement by the standard-setting body, (not just in the Framework, which is explicitly over-ridden by standards in the event of any conflicts), may be a very effective means of keeping it there.

Thirdly, the issue of an over-ride for preparers is less clear-cut. Nobes' arguments are essentially practical. He accepts that 'one might be comfortable with indulging a *philosophical* preference for the former [ie breaking Type C rules, with explanation]' (emphasis added). We have argued here, and elsewhere, in support of this view. Practically, there are disadvantages whichever way one jumps. A rule-bound approach decreases relevance, flexibility and progress (and also the critical faculties of accountants generally; consider the pre-1989 systems in Eastern Europe, or the objective test type questions on GAAP in the US CPA exams).

An effective over-ride for preparers (and auditors) certainly increases the risk of claimed justifications for departing from Type C rules. But it also provides a mechanism for over-ruling creative stretching of Type C rules. 'Substance over form' is itself a meta-rule, being in many situations merely a reincarnation of TFV, and it is this principle which is intended to prevent the use of artificially constructed situations designed to mislead through the use of inflexible rules. If it walks like a duck and quacks like a duck, then it is a duck, whatever the label says. Use of an over-ride by a preparer should be accompanied by very full disclosure of the circumstances (as IASC requires). It necessitates a strong and effective enforcement mechanism, which IASC does not currently possess, together with some appeal process. Local regulators, and eventually stock exchanges, have a major role to play as regards enforcement. The issue of an appeal process should be an urgent item on the IASC agenda.

Fourthly, the effect of the international dimension remains an issue in its own right. The world is not uniform and so accounting, as an intersubjective social construct, cannot be uniform either. Differences must be exposed, discussed, understood, appraised, and tolerated when rationally grounded. A meta-rule, over-riding at all levels, coupled with full disclosure and effective monitoring and control, provides parameters, both conceptually and in practice, which are capable of significantly assisting this process.

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Book reviews

Cash flow and Corporate Finance in Victorian Britain. *T. J. Baldwin, R. H. Berry, R. A. Church and M. V. Pitts.* University of Exeter Press, August 2000. 168 pp. £50.00

Having received this book for review from the editor of *Accounting and Business Research,* I was delighted to find researchers combining two of my main research interests – cash flow accounting and accounting history. In this case, the objective of the authors was to analyse the financial performance of coal, iron and steel companies – not as an individual case study, but involving 21 companies from the mid- to late-Victorian period.

The text starts with a description of the corporate environment of this period, including the Limited Liability Act (1955), the Joint Stock Companies Act (1856), the Companies Act (1862), and the Companies Act (1900). The analysis is brief and concentrates on the provisions for accounting and auditing in these enactments.

The text then moves to developments in financial reporting in the same period and comments on the move from cash-based 'charge and discharge' accounting to 'accrual' accounting using double-entry bookkeeping. The analysis is used to identify the purpose of income reporting and, unsurprisingly, concentrates on cost allocation issues (including fixed asset depreciation).

To this point, the authors have revealed little that has not already been covered in a variety of texts and writings (to which ample acknowledgment is made). The originality of this text is seen in Chapter 4, in which the research methodology is explained. Rather than concentrate on accrual-based analysis, the authors focus on cash flow data. They contrast this with the previous work of writers such as Lee (1979) and Edwards and Webb (1982). In particular, they argue against the use of funds flow data in Lee (1979), and present arguments for the use of non-accrual data as in cash flow accounting. In doing this, they make no reference to Lee (1983), which is a cash flow accounting study of the Hong Kong and Shanghai Bank from 1865 to 1980 using aggregate data, or Lee (1984), a study of government-supported industries on an annualised basis. These studies predate the current text, and would have assisted the authors in their pursuit of a relevant and reliable methodology to analyse historical accounting data. Chapter 4 is also devoted to explaining how to derive cash flow data from accrual data. This chapter is of considerable use to accounting, business and economic historians faced with archives consisting of accrual-based accounting data.

Chapter 5 briefly introduces, by example, the cash flow data presented in Part Two of the text for the 21 companies (these data constitute two-thirds of the text). It is here that the value of this text resides. These data are the meat of an analysis of financial performance. However, without explanation, the reader is left in suspended animation. Having presented the data for each of the companies, the authors do not continue with their analysis. This leaves the text as if it were only half complete. Perhaps there is another text in the pipeline covering the analysis, but certainly the authors and publisher have left their readers in a situation where the value of the research methodology and the disclosed data cannot be properly judged in the absence of a cash flow-based analysis. The value of the text can therefore only be judged in terms of its potential to reveal corporate performance in a historical context. It also provides non-accounting historians with an understanding of the difference between profit and cash flow data. Whether these historians will adopt the methodology successfully and reliably is another doubtful matter. The details of accounting records are such that cash flow accounting data production almost necessitates a research team of accountants and non-accountants (as seen in the authorship of this text). Meantime, I await with interest the next instalment of this project – the demonstration of the historical value of cash flow-based research of financial performance.

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Henry Rand Hatfield: Humanist, Scholar and Accounting Educator. *Stephen A. Zeff.* JAI Press, Stamford, Connecticut, 2000. xxiii + 471pp. (available from Elsevier Science, PO Box 211, 1000 AE Amsterdam, The Netherlands) £50.50.

This is the definitive study of H.R.Hatfield, with some 300 pages of biography and review, and nearly 200 pages of Hatfield's own published and unpublished papers. Professor Zeff started writing this book in 1964, and it evidently became a labour of love.

As ever, Zeff's work is meticulous and entertaining. Even the subtitle is carefully worded. Hatfield was a scholar (in many fields) and a remarkable educator (in accounting). His reputation was less as a contributor to accounting thought than as an erudite and valued teacher and administrator, first at the University of Chicago and then, for most of his life (from 1904 virtually to his death in 1945), at the University of California at Berkeley, where he held the first full time chair of accounting in the US – probably in the world – punctuated by an important spell in 1918–9 on war work in Washington.

Zeff uses the term humanist to mean someone widely read in the classics and fluent in Greek and Latin (as well as French and German), so that his strong religious views were set in this wider context. Hatfield was indeed part of a long Methodist tradition, which he never deserted. He and his beloved wife Ethel (who, like Henry, had a Chicago doctorate in political science, although she never worked outside the home) were much caught up in university affairs as Berkeley grew in eminence. Hatfield himself played a major role in this, acting for many years as a dean (first of the new College of Commerce and then of faculties) while California's student numbers rapidly grew. By 1921–22 it had 11,505 full time students, so (in a world before computers) the burdens of administration must have been substantial.

As for Hatfield's contribution to accounting, he was very conscious that he was not professionally accredited. He taught a range of accounting courses, and by all accounts he was an inspiring teacher – never didactic, but always keen to encourage disputation, analysis and clear expression. Undergraduates came to dinner at home with him and Ethel, and Hatfield encouraged them to think about accounting in the context of its legal and economic consequences. Although he supervised many master's theses, Hatfield only had one doctoral student during his career, Catharine Greene; and she had to overcome his disbelief that accounting justified study and research at the doctoral level (p.241).

There is much in the book about Hatfield's family background, his forebears as well as his successors, and about his active membership of Berkeley societies, his successes as an after-dinner speaker, and even his appalling car driving. For me, the outstanding paper among the unpublished works in the book is the address given at the Charter Day Assembly of the Southern Branch of the University of California in 1922. Here, Hatfield explains with great clarity and force why it is necessary to set up a branch of the (state-financed) University of California in Los Angeles when there were already several very successful private universities in the area. His argument for intellectual freedom in a democracy, as against narrow vocational training, is still vitally relevant, not only in the US.

Of course, to readers of this journal it will probably be Hatfield's views on accounting and business that are of most interest. He was engaged in some important issues, even though he was no proselytiser. He supported a proprietary view of the firm, as opposed to W.A.Paton's entity view (p.68); he could accept the inclusion of interest on capital as part of the cost of manufactured goods, and probably of fixed assets constructed (p.85). He was uneasy about inconsistencies in the use of the realisation principle, which made including interest income anomalous (p.139). He sternly disapproved of using the 'lower of cost and market' rule for valuing inventories (p.143). While not an advocate of current values (like Paton, p.137), he could accept the idea with equanimity.

Zeff notes that Hatfield was invited to contribute to a symposium in 1929 on the accounting treatment of appreciation. Controversy raged in the 1920s, 'especially as numerous corporations were writing up their assets and the authorities were in disarray' (p.136, citing Walker 1992). However, Walker quotes Fabricant (1936), who shows that only a minority of listed companies revalued between 1925–1934, either upwards or downwards, even though there were no regulations to forbid either. 70 out of 208 revalued physical fixed assets upwards in the decade (never more than 18 in a year); 43, investments; and seven, intangibles. Moreover, Walker quotes Dillon (1979), who re-examined 110 companies from Fabricant's sample of 208 over this period: 'not one of the 110 firms had used imputed revaluations to increase reported earnings'. Was the controversy baseless?

Hatfield's humour could be mocking, even against himself. He begins his 1927 *Journal of Accountancy* paper, 'What is the matter with accounting?' by asking why anyone would want to defend the reputation of accountancy by quoting its antiquity in comparison with the natural sciences. But this was exactly the approach he took in his most famous paper, 'An historical defense of bookkeeping' (1923).

To read the 1927 paper today is salutary. Hatfield

protests that accountants were not even agreed on definitions of the basic terms in their discipline. Yet today the Accounting Standards Board in Britain (like the International Accounting Standards Committee) cannot decide how to distinguish operating performance from financing and 'other' gains and losses. One cannot imagine Hatfield ranting with outrage and disbelief at this situation today, but he might well have penned, and even read to his colleagues, an elegant Alexandrine containing some *very strong sarcasm indeed*!

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Foundations for the Future: The AICPA from 1980 to 1995. *Philip B. Chenok* with *Adam Snyder.* JAI Press Inc., 2000, Stamford, CT. xvi + 204pp. $78.50 (£50.50).

This is the third in a series of useful retrospectives by the chief administrative officer of the American Institute of Certified Public Accountants (AICPA). The first, entitled *The Rise of the Accounting Profession*, was published in two volumes by John L. Carey (1969/70), who served in that capacity from 1930 to 1968. Carey's was much more than a memoir. It was a veritable history of the public accounting profession from 1896 to 1969, and it was exceptionally well researched and written. Wallace E. Olson, who ran the Institute from 1969 to 1980, also produced a well-researched and written history, entitled *The Accounting Profession, Years of Trial: 1969–1980* (1982), following his tenure.

Now we have a memoir by Philip B. Chenok, the AICPA's head from 1980 to 1995, and it is the first of the three not to be published by the Institute. That this volume is preoccupied more with the AICPA than its predecessors is implied by its title: *Foundations for the Future: The AICPA from 1980 to 1995.* Chenok's book is the second in a new series under the imprint of JAI Press Inc., *Studies in the Development of Accounting Thought*, edited by Gary Previts and Rob Bricker.

The great value of these books by the administrative heads of the Institute is that they knit together the myriad threads of activities and developments that occurred under their watch. Outsiders and even Institute insiders usually can track only the matters that they happened to have watched closely at the time,or in which they were involved. Chenok's book provides its readers with a compact summary and analysis of the issues and controversies that he faced during his period of office.

As Chenok brings out vividly in the book, the AICPA, which is a voluntary association of CPAs licensed under one or more state laws, must contend with forces at both the federal and state levels, as it endeavours to steer the national public accounting profession. Apart from concerns over periodic tides of litigation against auditors, which can be brought in the federal or state courts, the AICPA must cope with the issues raised in the federal Congress and by federal regulatory bodies, chiefly the Securities and Exchange Commission (SEC) and the Federal Trade Commission (FTC). A further set of issues arise from the level of the 50 states and four additional jurisdictions: the state legislatures, the state boards of accountancy (which license CPAs), and the state societies of CPAs (which are the voluntary associations of CPAs licensed in each state) continually remind the Institute that the national profession is inescapably an amalgam of shifting state and local interests.

Chenok began his service as Institute president when a wave of litigation against auditors led to public criticism over alleged audit failures, and

Congressional hearings followed. After decades of trying to persuade the public that the external auditor should not be required to seek out financial fraud, the Institute was finally forced in the 1980s to close the 'expectation gap' by imposing that very responsibility on auditors. Then the FTC, following years of protracted negotiations, forced the Institute to amend its ethical norms to allow contingent fees and commissions in other than audit engagements (Chs. 2 and 4).

Two of the largest issues involving state interests were the Institute's campaigns to require all CPA candidates to complete five years, instead of only four, of university-level education, and to impose a 'continuing professional education' requirement on all CPAs. To have any chance of success, these reforms had to secure the strong support of the professional leaders at state level. The former required legislation for which the full support of state professional leaders was necessary but not always sufficient, while the latter required approval by the Institute's 200-member Council, whose members are delegates of the state societies of CPAs (Chs. 3 and 5).

An issue that only began to surface during Chenok's tenure, and which has escalated in intensity in the last few years, is the controversy swirling about the independence of the auditor in the context of the expanding range of non-audit services. Chenok, a one-time partner in a major audit firm, saw the growth of diverse consulting services by auditors as a positive development, one that was essential to the profession's survival (pp.8–10, 84–86). The SEC has since raised the decibel level of the controversy and has taken a strong position on the incompatibility of certain non-audit services and auditor independence.

Compared to the volumes by Carey and Olson, Chenok's book provides much less discussion of views from beyond the Institute and the big accounting firms. The views of two vocal dissenters within the Institute, Abe Briloff and Eli Mason, are confined to a pair of sentences, and an additional sentence is considered sufficient to cover the views of another critic of the big accounting firms, Robert Chatov.

The research for the book seems to have focussed heavily on documenting facts and views from within the Institute. The heavy involvement of Chenok's collaborator, Adam Snyder, may have contributed to a narrowing of the scope. In the Acknowledgments, Chenok writes that, without Snyder, 'this project never would have been started and certainly never would have been completed...' (p.x). Snyder is apparently a professional writer who may have composed much of the manuscript and may also have chased down many of

the details. One wonders whether Chenok actually read the final manuscript at all carefully, because he would not have allowed so many annoying slips to creep in (e.g., the misspelling of Richard Hickok and Hurdman Cranstoun, p.2, and of Pannell, Kerr & Forster, p.23; Pricewarehouse, p.20; ETIF instead of EITF, pp.149–150; Congressman Dingell listed as an author of a GAO report that was addressed to him, p.192; and a mis-writing of the names of two of his former partners, LeRoy Layton and Archibald MacKay, p.ix and elsewhere). Chenok writes that Carey (1969/70) was 'the prototype for this text' (p.2). The book is a valuable contribution, but it would be very difficult for anyone to match Carey's high standard.

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The guest editor of this issue is **John K. Courtis**, Professor, Department of Accountancy, City University of Hong Kong, 83 Tat Chee Ave., Kowloon, Hong Kong, to whom papers should be sent by **September 2001**. Completed papers will be double-blind refereed and the theme issue is expected to appear in 2003. Informal inquiries to discuss possible (innovative) themes are welcome and a one-page expression of interest indicating the intended topic may be submitted as soon as practical by e-mail to acapjajc@cityu.edu.hk

Accounting and Business Research

The effect of a potential borrower's reporting reputation and financial condition on commercial loan officers' estimates of forecast bias and subsequent loan recommendations

Information content of earnings in an unregulated market: the co-operative cotton mills of Lancashire, 1880-1900

Reverse stock splits and earnings performance

Mathews, Gynther and Chambers: three pioneering Australian theorists

Accounting and Business Research

The Institute of Chartered Accountants in England and Wales

ISSN 0001-4788

Accounting and Business Research

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The effect of a potential borrower's reporting reputation and financial condition on commercial loan officers' estimates of forecast bias and subsequent loan recommendations

Richard W. Houston and Michael F. Peters*

Abstract—This paper investigates whether a potential borrower's reporting reputation and financial condition affect commercial loan officers' loan judgments and recommendations after receiving an earnings forecast that predicts improved financial performance. The results suggest that the earnings forecast is perceived as more credible in the presence of (1) a reputation for objective reporting, and (2) strong financial condition. Also, a reputation for objective reporting allowed the borrower to more credibly convey the expected improvement in performance when financial condition was weak. However, while financial condition predictably affects loan recommendations (likelihood of granting the loan, interest rate), reporting reputation does not. While we find that commercial loan officers discount forecasts under similar circumstances as stock analysts, results suggest that the consequences of developing a reputation for aggressive reporting (e.g., aggressive selection of accounting methods and estimates *within GAAP*) may be greater in a stock valuation setting (prior research documents lower stock prices) than in a loan setting.

1. Introduction
This paper investigates whether a potential borrower's reporting reputation (objective or aggressive reporting within GAAP) and financial condition (strong or weak) affect commercial loan officers' (CLOs) loan judgments and recommendations after receiving an earnings forecast. We examine specifically whether a reputation for objective (as opposed to aggressive) reporting allows a company to convey credibly an expected improvement in performance regardless of financial condition.[1] While only Beaulieu (1994) has investigated the joint effects of reporting reputation and financial condition on CLOs' behaviour, he not only manipulated poor reputation to suggest a high likelihood of fraud (as did Hirst and Koonce

1996), but also manipulated weak financial condition so strongly that it precluded participants from processing and reacting to the reputation manipulation. Consequently, whereas prior research defines reputation in a manner suggesting a high potential for fraud (e.g., poor management character), we are the first to define reputation in terms of whether management reports aggressively or objectively *within GAAP*.[2]

Prior research suggests that management develops reporting reputations based on prior reporting

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The final version of this paper was accepted in January 2001.

[1] Management develops reporting reputations based on whether it makes accurate forecasts (i.e., accuracy) and/or tends to bias forecasts (i.e., objectivity). While archival research largely has examined the accuracy component of reporting reputation or cannot distinguish between accuracy and objectivity, we examine specifically the objectivity component.

[2] Management has opportunities to bias its financial communications within the confines of GAAP by choosing accounting methods that maximise reported earnings, basing accounting estimates on best-case scenarios, and releasing the most optimistic earnings forecast. Although management can use accounting discretion to accurately portray its operating, investment and financing decisions (Loomis 1988), it often aggressively applies available discretion to mislead users (Dopuch 1989; Healy and Palepu 1993; 1996). Consequently, users often discount management's communications, even if the communications are unbiased (Gonedes and Dopuch 1988; Dopuch 1989; Bloomfield 1996; King 1996; Peters 1999), requiring management to expend resources to convince users that its communications are credible (Cairney and Richardson 1998) or accept a higher cost of capital (Healy and Palepu 1996).

behaviour (e.g., Trueman 1986; Williams 1996) and that financial statement users rely on these reputations when evaluating financial communications (e.g., King 1996; Gigler and Hemmer 1998). Choi and Ziebart (1999) document a positive relationship between reputation for forecast credibility and stock price responses to management earnings forecasts, suggesting that investors discount information from companies with a reputation for less credible (i.e., optimistic) forecasts.[3]

The financial press contends that management acts on its incentives to obscure weak financial condition by biasing its financial communications (Byrnes 1998; MacDonald 1998). Consistent with this concern, companies with weak financial condition often (1) adopt aggressive accounting practices (Lillian et al. 1988; Kinney and McDaniel 1989) and (2) issue earnings forecasts that exhibit upward bias, with these forecasts perceived as less credible than those issued by non-distressed companies (Koch 1999). Given that it is generally difficult for management to credibly convey an improvement in operating performance or financial condition under any conditions (Bloomfield 1996; Cairney and Richardson 1998), it faces *even greater* difficulties if the company suffers from poor financial condition.

In this study, 85 experienced CLOs, after evaluating an earnings forecast predicting improved financial performance, assessed the credibility of a potential borrower's earnings forecast and made loan-related recommendations (i.e., whether to pursue the borrower and an interest rate premium). Except for independently manipulating two factors between CLOs, all other information was held constant in the experiment. The first manipulated factor is the borrower's reporting reputation (reputation for reporting objectively or aggressively within GAAP). The second manipulated factor is the borrower's financial condition (strong or weak relative to the industry).

The results confirm our predictions that the earnings forecast is perceived as more credible in the presence of (1) a reputation for objective reporting and (2) strong financial condition. In addition, a reputation for objective reporting allowed the potential borrower to convey more credibly the expected improvement in financial performance when the borrower's financial condition was weak. This result suggests that CLOs recognise potential borrowers' incentives (e.g., financial condition) and propensity to bias (e.g., reporting reputation) when analysing forecasts, and that a reputation for objective reporting acts as a signal that the potential borrower has overcome its incentives to bias.

However, while financial condition affects loan recommendations – less willing to pursue the borrower and a higher recommended interest rate premium in the presence of weak financial condition

– the borrower's reporting reputation does not. Consequently, our results suggest that, while the extent to which CLOs discount forecasts is a function of reporting reputation and financial condition, CLOs do not penalise borrowers (i.e., companies do not incur costs) for aggressive, but allowable, reporting when making loan recommendations.

Our results contribute towards an understanding of why reporting reputations vary across companies (Lang and Lundholm 1996). Because financial statement users may not fully remove bias from financial communications (Brown 1996; Choi and Ziebart 1999), companies engaging in aggressive reporting may benefit in stock valuation settings. That is, because reported earnings are important to stock valuation (e.g., P/E multiples), if analysts do not adjust fully for aggressive reporting, stock could be overvalued because earnings are overstated.[4] In addition, because CLOs discount earnings forecasts under similar circumstances as stock analysts, but do not alter loan recommendations when a borrower has a reputation for aggressive reporting within GAAP, the consequences of a reputation for aggressive reporting may be greater in a stock valuation setting than in a loan setting.

This study complements earnings forecast research by providing evidence that CLOs tend to be pessimistic when evaluating management forecasts, most likely because they know that potential borrowers benefit from making optimistic earnings forecasts (higher likelihood of obtaining the loan, more favourable loan terms). Historically, research on investment analysts' forecasts suggests that analysts' forecasts exhibited an optimistic bias (e.g., Francis and Philbrick 1993; McNichols and O'Brien 1997). However, a growing body of literature suggests that analysts' forecasts often are pessimistic, perhaps because management intentionally guides analysts towards conservative forecasts, knowing that there will be positive stock price reactions when actual earnings exceed the conservative forecasts (Richardson et al. 1999; Matsumoto 2000). Although research now suggests pessimistic bias in both loan and stock valuation settings, the reason for this bias may differ – in loan settings, CLOs discount management forecasts whereas in stock settings, analysts' conservative forecasts are a function of management's biased information.[5]

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[3] Other studies document that, in general, stronger reporting reputations are associated with higher stock prices (Welker 1995; Healy et al. 1996).

[4] Similarly, while companies may reap short-term benefits from aggressive reporting (Bloomfield 1996; Peters 1999), continued aggressive reporting results in a reputation for aggressive reporting, causing users to discount financial communications (Gonedes and Dopuch 1988).

2. Theory and hypothesis development

2.1. Theory and hypotheses

Attribution theory describes how individuals process information in an environment in which communicators have incentives to bias their communications. Individuals identify relevant cues to determine whether the communicator has incentives to bias its communication (Eagly and Chaiken 1993). If the cues signal that these motivations exist (e.g., weak financial condition), then the user will adjust the communication in the direction consistent with the incentives (Eagly et al. 1978; Birnbaum and Stegner 1979; Eagly et al. 1981). If the communicator demonstrates that it previously has overcome incentives to bias, the extent to which the communication is adjusted will be attenuated (Eagly et al. 1981).

Minimising the cost of capital provides management with a natural incentive to bias its financial communications. Accordingly, users recognise this incentive and respond by discounting information from management, even in the absence of any explicit cues about management's incentives or reporting reputation (Peters 1999). However, companies can develop a reputation for objective reporting, a signal that, in the past, management has overcome its incentives to bias its communications (Sobel 1985). We predict that CLOs will react to this cue when evaluating an earnings forecast and judge a forecast as more credible when management has developed a reputation for objective (rather than aggressive) reporting.

H1: CLOs will judge an earnings forecast as more credible when management has an objective (vs. aggressive) reporting reputation.

Financial condition provides a signal about management's incentives. Weak financial condition suggests that management faces incentives to bias its financial communications, perhaps by aggressively applying GAAP. Consequently, companies suffering from weak financial condition may have difficulty being judged as credible reporters (Palepu et al. 1996). We expect that CLOs will recognise that weak financial condition provides an incentive to bias an earnings forecast and discount the forecast accordingly.[6]

H2: CLOs will judge an earnings forecast as more credible when financial condition is strong (vs. weak).

H2 predicts that an earnings forecast will be less credible in the presence of weak (vs. strong) financial condition because CLOs recognise management's incentives to bias an earnings forecast. However, a reputation for objective reporting suggests that management previously has overcome its incentives to bias, whereas a reputation for aggressive reporting suggests that management tends to act on its incentives. Therefore, we predict that,

because a reputation for objective reporting signals that management previously has overcome incentives to bias, management's ability to convey an expected improvement in performance will not be impaired by weak financial condition.

H3: Weak financial condition will (will not) impair the credibility of an earnings forecast in the presence of an aggressive (objective) reporting reputation.

2.2. Loan recommendations

Because CLOs' primary concern is that a borrower will service its debt, weak financial condition is associated with higher interest rates and a lower likelihood that loans are granted (e.g., Libby 1979; Beaulieu 1994; Palepu et al. 1996). However, many lending guides and loan analysis models do not explicitly include reporting reputation as an input to loan analyses.[7] In addition, while prior academic research generally has demonstrated economic consequences from a poor reporting reputation, King (1996) reports that, even when information sources develop reputations for truthful reporting, they do not always benefit, perhaps because information evaluators believe that sources could renege on their reputation at any time. Further, our definition of reporting reputation (i.e., aggressive or objective *within GAAP*) differs from prior research (e.g., management's personal character; Beaulieu 1994). Therefore, whilst we expect loan recommendations (e.g., likelihood of granting the loan, interest rate) to be affected by financial condition, the effect of reporting reputation is unclear.[8] Consequently, we perform exploratory analyses to examine the effect of reporting reputation on loan recommendations.

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[5] Forecasts in stock and loan settings differ in other ways. First, management forecasts provided in stock settings tend to be publicly available, whereas management forecasts in loan settings tend to be private (between the borrower and the bank). Second, companies benefit in the future from pessimistic earnings forecasts in stock settings (higher stock prices when reported earnings later exceed forecast) whereas they may incur costs in the present when CLOs make pessimistic forecasts (e.g., higher loan costs).

[6] Similarly, in an audit context, auditors recognise this incentive as they assess a higher likelihood of a material misstatement for clients with poor financial condition (Hirst 1994).

[7] We base this statement on conversations with several CLOs from several large banks and after scanning a widely used commercial lending manual (Ruth 1995).

[8] Prior research examining the factors that affect CLOs' interest rate recommendations suggest lower interest rates in the presence of strong financial condition, strong management, unqualified audit opinions, and auditor examination of forecasts (but not a compilation; Libby 1979; Strawser 1994). However, the results of these studies do not provide insights into the effect of an aggressive or objective reporting reputation within GAAP on interest rates.

3. Research design

3.1. Participants and research case

To investigate the effects of a potential borrower's reporting reputation and financial condition on CLOs' judgments about management's earnings projections and subsequent loan recommendations, we designed and conducted a 2 x 2 between-subjects experiment. Participants were 85 CLOs from eight large commercial banks located primarily in the Midwest and Northeast regions of the US.[9] We obtained CLOs from larger banks to ensure that participants had experience evaluating the type of loan (large loan to medium-sized, publicly-held manufacturing companies) portrayed in the case.[10] Contact persons at each bank distributed the cases. Participation was voluntary, and cases were distributed randomly across the experimental conditions. Because the cases were randomly distributed in sealed envelopes, contact people were not aware of the manipulations when they distributed the materials to participants. To ensure anonymity, the participants omitted their names and returned completed cases to the contacts in sealed envelopes. Although contact people were asked to return undistributed cases so that we could determine the response rate, some did not. However, 59% of the distributed cases were completed. The participants averaged 12.1 years of banking experience, 66% had either completed or were currently in graduate school, and 92% indicated that they had lent to publicly-held companies in the past two years.[11]

The case materials were based on an actual company and modified to incorporate the independent variables investigated in this study. The case was exhaustively pilot tested by experienced CLOs from several large commercial banks. Each completed the case and then participated in hour-long debriefing sessions in which they evaluated the experimental manipulations; described their thought process when completing the case; and provided suggestions for how to improve the case. All CLOs participating in the pilot test reacted to the independent variables as intended and made suggestions that improved the case's clarity and realism.

The case materials consisted of two parts, background information about a potential borrower, Technology, Inc. (Technology), followed by a series of questions about the case and participants' background. Participants were asked to assume the role of a CLO reviewing a loan application from a potential borrower. They were told that their bank is considering whether to participate in a six-year, unsecured term loan to Technology, with other loan features (e.g., interest rate) yet to be determined. We then provided information about Technology, including its industry, management, and summary financial statement figures, which included the financial condition manipulation.

Participants then were provided with the reporting reputation manipulation, followed by a summary of a letter from Technology's CEO, which stated that the loan proceeds will be used to purchase equipment that is projected to substantially increase earnings before interest and taxes (EBIT) by reducing labour, maintenance, and warranty costs. The letter also provided the following projected figures: (1) sales; (2) EBIT; and (3) the ratio of EBIT/Sales. These figures were the same across all four conditions, causing the relationship between projected and historical figures to be the same across all four conditions. The letter also included the projected debt coverage ratio (described as having been prepared by analysts with the participant's bank), along with industry comparisons at the 10th and 90th industry percentiles.[12]

Except for information related to the two independent variables, all information was held constant in the design of the experiment. The first manipulated independent variable was the potential borrower's financial condition. Financial condition was manipulated as either strong or weak by varying the historical level of debt to equity (total liabilities divided by total stockholders' equity; D/E). The potential borrower's D/E approximated the 10th (90th) industry percentile in the WEAK (STRONG) condition (lower percentile represents a higher D/E ratio). Similarly, Technology's debt coverage ratio approximated the 10th (90th) percentile in the WEAK (STRONG) condition.[13] The Appendix presents the WEAK and STRONG manipulations.

The second manipulated variable was the potential borrower's reporting reputation. Reporting reputation was manipulated as either aggressive or objective within GAAP. To emphasise that the potential borrower complies with GAAP, in the aggressive (objective) condition, participants were told that analysts from their bank have noted that the potential borrower follows GAAP but maximises projected and reported income (objectively projects and reports income) through its aggressive

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[9] The participating banks were typical of larger banks in their region in that they make loans of all sizes to a broad range of companies in various industries, including manufacturing and service.

[10] In addition, 87% of participants indicated that they had experience lending to manufacturing companies whose size at least approximated the size of the company described in the case materials (with an average of 33% of their time spent analysing companies of this size).

[11] The cases were completed in September–December 1997. None of the results reported in this paper were contingent upon commercial lending experience, bank affiliation, or level of experience lending to publicly-held companies.

[12] The debt coverage ratio was calculated as follows: projected EBIT plus depreciation divided by the current portion of interest and principal payments on existing and proposed debt as well as capital expenditures in excess of proposed loan proceeds.

(unbiased) selection of accounting methods and estimates.

We designed the experimental materials to manipulate the company's reporting reputation in terms of whether it reported aggressively or objectively within GAAP while holding management's personal character constant. That is, we provided information to all participants that described management as well-educated, cooperative and prompt in providing requested information, and as not having criminal records (consistent with the facts related to management's personal character manipulated by Beaulieu 1994). In addition, during pilot testing, we ensured that the reporting reputation manipulation provided information about management's actions within GAAP rather than their personal character.[14] The Appendix includes the reporting reputation manipulations for both conditions.

3.2. Dependent variables

After reviewing the background information and the company's projections, participants were asked to provide an estimate of the most likely outcome for EBIT. Perceived bias (BIAS), a proxy for forecast credibility, equals the difference between participants' estimate of actual EBIT and management's projected EBIT (Peters 1999).[15]

To determine how the independent variables affected subsequent loan recommendations, we asked participants to indicate their willingness to pursue Technology as a borrower and to recommend an interest rate premium for the proposed loan. To indicate their willingness to pursue Technology as a borrower, participants responded to the following question: 'How strongly would you agree or disagree with a decision to pursue the Corporation as a borrower?' (1 = Strongly disagree; 11 = Strongly agree). To recommend an interest rate, participants responded to the following question: 'Assume that the average interest rate premium for the industry is 100 basis points. Recommend the interest rate premium for the Corporation' (_____ basis points).[16]

4. Results
4.1. Manipulation checks

Recall that the two variables manipulated in this study are a potential borrower's reporting reputation and financial condition. To ensure that the manipulations worked as intended, we asked for details about the items manipulated in the case materials. For the financial condition manipulation, participants assessed the company's financial condition on an 11-point scale (1 = Much weaker than normal; 11 = Much stronger than normal). Participants in the STRONG condition (mean = 8.69, s.d. = 0.95) rated the borrower's financial

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[13] In a similar study, Beaulieu (1994) manipulated financial condition by presenting participants with a list of positive or negative accounting facts (i.e., phrases that describe financial condition). Beaulieu found that, when accounting facts were negative, all of the experienced participants in the study decided not to approve the proposed loan and ceased processing information provided in the case. To ensure that participants in our study would attend to all case information (including the reputation manipulation), we designed the WEAK condition to be weak enough so that participants would recognise weak financial condition, but not so weak that participants would fail to consider the loan request. To assess whether this control worked, participants were asked whether they would 'agree with a decision to pursue the Corporation as a potential borrower' (1 = Strongly disagree; 11 = Strongly agree). In the WEAK condition, 55% (67%) of participants chose a scale value of 6 (5) or above, with only one participant indicating a scale value of 1.

[14] To ensure that the reporting reputation manipulation did not affect participants' assessments of management's personal character, we asked participants to assess management in terms of being cooperative and prompt in providing CLOs with all information requested (a proxy for impressions about management's character formed based on personal dealings with management; Beaulieu 1994; Ruth 1995). Responses did not differ significantly across reporting reputation conditions (7.84 and 8.42 for the aggressive and objective conditions based on a scale on which 1= Extremely weak and 11= Extremely strong). Responses for both reporting reputation conditions significantly exceeded the scale midpoint of 6, suggesting that management was perceived as having strong character. In addition, results are virtually the same if responses to this question are included as a covariate for each of the ANOVAs reported in the paper.

[15] Because the higher D/E ratio for WEAK described in Section 3.1 is attributable to higher total debt, interest expense is higher for WEAK than for STRONG. The lower ratio of historical net income for WEAK than for STRONG was attributable solely to differences in interest expense (and the related income tax effect). That is, historical sales, historical EBIT, historical total assets, and projected EBIT were the same across all four conditions. Consequently, because management's forecast and participants' most likely forecast both are defined in terms of EBIT, any differences in net income caused by differences in interest expense should not affect the results.

[16] Although we chose to ask participants to recommend only an interest rate premium, loan terms also include debt covenants. While some suggest anecdotally that violating covenants is not costly because covenants generally are waived or renegotiated (Palepu et al. 1996), empirical evidence suggests that borrowers often do suffer significant economic consequences when covenants are violated (e.g., Chen and Wei 1993; Beneish and Press 1993). In our experiment, we chose to focus on interest rate premium as a proxy for economic consequences of the independent variables so as to be consistent with other behavioural research in the area. The possibility that our independent variables would have affected interest rates and debt covenants differently represents a potential limitation of our study. However, it is important to note that companies in the strong and weak financial condition differed primarily in terms of ratios related to leverage (e.g., debt-to-equity ratio) because prior research suggests that differences in leverage similarly affect interest rates and debt covenants (i.e., greater leverage associated with higher interest rates and more restrictive covenants; Sengupta 1998; Begley and Feltham 1999). In addition, we have no theoretical basis for predicting that the reporting reputation manipulation would have affected the interest rate premium and debt covenants differently.

Table 1
Descriptive statistics and ANOVA for BIAS

Panel A: Mean BIAS (Standard Deviation)[a]

Financial condition	Reporting reputation		
	Objective	Aggressive	Total financial condition
Strong	3,580.89 (2,810.55) n = 20	5,212.75 (2,021.54) n = 22	4,435.67 (2,536.57) n = 42
Weak	4,082.73 (2,448.21) n = 22	6,397.29 (2,266.37) n = 21	5,213.09 (2,610.22) n = 43
Total reputation	3,843.76 (2,606.71) n = 42	5,791.24 (2,201.86) n = 43	4,828.96 (2,588.43) n = 85

Panel B: Analysis of variance for BIAS

Factors	df	F-Statistic	Probability
Financial condition	1	2.63	0.05
Reporting reputation	1	14.41	<0.01

Panel C: Planned contrasts for H3

Contrasts		t-Statistic	Probability
Strong/Objective versus Weak/Objective		0.61	0.54
Strong/Aggressive versus Weak/Aggressive		1.81	0.04

[a] BIAS equals the difference between participants' estimates of actual earnings before interest and taxes (EBIT) and management's projected EBIT. All means and standard deviations are in thousands of dollars.

condition as significantly stronger than those in the WEAK condition (mean = 4.45, s.d. = 1.57; t = 15.00, $p < 0.01$).

To ensure that the reputation manipulation worked as intended, participants rated the borrower's reporting reputation on an 11-point scale (1 = Conservative reporting; 6 = Objective reporting; 11 = Aggressive reporting). Participants in the aggressive condition (mean = 9.37, s.d. = 1.04) rated the borrower's reporting reputation as significantly more aggressive than those in the objective condition (mean = 6.37, s.d. = 0.97; t = 12.87, $p < 0.01$).

4.2. Experimental results

The descriptive statistics for CLOs' BIAS judgments are reported in Panel A of Table 1. Hypotheses 1 and 2 are tested using a 2 x 2 ANOVA (reported in Panel B of Table 1) with reporting reputation and financial condition as the independent variables and BIAS as the dependent variable. The significant main effect for reporting reputation provides strong support for H1 (F = 14.41, $p < 0.01$). Consistent with the prediction, BIAS is higher when the borrower has a reputation

for aggressive reporting (mean = $5,791; all means for BIAS reported in thousands of dollars) compared to objective reporting (mean = $3,844). Hypothesis 2 is supported by the significant main effect for financial condition (F = 2.63, p = 0.05). Consistent with the prediction, BIAS is higher when the borrower's financial condition is weak (mean = $5,213) compared to strong (mean = $4,436).

The third hypothesis predicts that, when a potential borrower has an objective (aggressive) reporting reputation, BIAS for WEAK will be equal to (greater than) BIAS for STRONG. The two planned comparisons reported in Panel C of Table 1 support H3. Specifically, in the presence of an objective reporting reputation, BIAS in WEAK (mean = $4,083) is equal to BIAS in STRONG (mean = $3,581; t = 0.62, p = 0.54). Conversely, in the presence of an aggressive reporting reputation, BIAS in WEAK (mean = $6,397) is greater than bias in STRONG (mean = $5,213; t = 1.81, p = 0.04). These results are consistent with CLOs believing that, because a potential borrower has overcome incentives to bias in the past, its current forecast will similarly be unbiased, even in the

Table 2
Descriptive statistics and ANOVA for pursue the borrower

Panel A: Mean PURSUE (Standard Deviation)[a]

	Reporting reputation		
Financial condition	Objective	Aggressive	Total financial condition
Strong	9.23 (1.58) n = 20	8.89 (1.75) n = 22	9.05 (1.66) n = 42
Weak	5.95 (2.48) n = 21	5.67 (2.18) n = 21	5.81 (2.31) n = 42
Total reputation	7.55 (2.65) n = 41	7.31 (2.54) n = 43	7.43 (2.58) n = 84

Panel B: Analysis of variance for PURSUE

Factors	df	F-Statistic	Probability
Financial condition	1	53.78	0.00
Reporting reputation	1	0.50	0.48
Financial condition x reporting reputation	1	0.004	0.95

[a] Willingness to pursue technology as a borrower (PURSUE) is based on responses to the following question: 'How strongly would you agree or disagree with a decision to pursue the Corporation as a borrower?' (1 = Strongly disagree; 11 = Strongly agree).

presence of an explicit incentive to bias (i.e., weak financial condition).[17]

Note that, in all conditions, participants discounted forecasted EBIT (in all four conditions, BIAS exceeded zero at $p < 0.01$), consistent with Peters (1999) who suggests that, all other things equal, CLOs discount earnings forecasts by approximately 20%. In this study, in the presence of an objective reporting reputation, discounts for both WEAK (mean = 15.4%) and STRONG (mean = 13.5%) were significantly less than 20% ($p < 0.03$ for both conditions). Conversely, in the presence of an aggressive reporting reputation, the discount in STRONG did not differ from 20% (mean = 19.6%, $p = 0.83$) and the discount in WEAK exceeded 20% (mean = 24.1%, $p = 0.04$). These results build on those in Peters (1999), who did not control for or manipulate reporting reputation, by suggesting that potential borrowers can improve forecast credibility, but not eliminate perceived bias, by developing a reputation for objective reporting.

4.3. Loan recommendations

After providing BIAS, participants were asked to indicate their willingness to pursue the potential borrower and recommend an interest rate premium. Willingness to pursue the borrower was measured on an 11-point scale (1 = Strongly disagree; 11 = Strongly agree with decision to pursue the borrower). The recommended interest rate premium was measured in terms of the number of basis points.

Pursue the borrower. The descriptive statistics for CLOs' willingness to pursue the borrower (PURSUE) are reported in Panel A of Table 2. A 2 x 2 ANOVA (reported in Panel B of Table 2) with financial condition and reporting reputation as the independent variables and PURSUE as the dependent variable was used to explore the effects of the independent variables on PURSUE. Results suggest that financial condition significantly affected PURSUE ($F = 53.78$, $p < 0.01$) whereas reporting reputation ($F = 0.50$, $p = 0.48$) and the interaction between financial condition and reporting reputation ($F = 0.004$, $p = 0.95$) did not. Not surprisingly, means for WEAK (mean = 5.81) and STRONG (mean = 9.05) suggest that CLOs are less willing to pursue a client that suffers from weak financial condition.

Interest rate premium. The descriptive statistics for CLOs' interest rate premium (INTEREST) are

[17] An aggressive reporting reputation resulted in greater perceived bias regardless of financial condition. Specifically, BIAS was greater in the presence of an aggressive reporting reputation in both STRONG ($t = 2.17$, $p = 0.03$) and WEAK ($t = 3.21$, $p < 0.01$).

Table 3
Descriptive statistics and ANOVA for Interest Rate Premium

Panel A: Mean INTEREST (Standard Deviation)[a]

	Reporting reputation		
Financial condition	*Objective*	*Aggressive*	*Total financial condition*
Strong	80 (45.22) n = 20	81.14 (41.90) n = 22	80.60 (42.98) n = 42
Weak	141.5 (51.07) n = 20	146.43 (44.07) n = 21	144.02 (47.08) n = 41
Total reputation	110.75 (56.89) n = 40	113.02 (53.79) n = 43	111.93 (54.98) n = 83

Panel B: Analysis of variance for INTEREST

Factors	*df*	*F-Statistic*	*Probability*
Financial condition	1	40.08	0.00
Reporting reputation	1	0.09	0.76
Financial condition x reporting reputation	1	0.04	0.85

[a] Interest rate premium (INTEREST) is based on responses to the following question: 'Assume that the average interest rate premium for the industry is 100 basis points. Recommend the interest rate premium for the Corporation' (_____ basis points).

reported in Panel A of Table 3. A 2 x 2 ANOVA (reported in Panel B of Table 3) with financial condition and reporting reputation as the independent variables and INTEREST as the dependent variable was used to explore the effects of the independent variables on INTEREST.[18] As for PURSUE, results for INTEREST suggest that financial condition significantly affected INTEREST ($F = 40.08$, $p < 0.01$) whereas reporting reputation ($F = 0.09$, $p = 0.76$) and the interaction between financial condition and reporting reputation ($F = 0.04$, $p = 0.85$) did not. Not surprisingly, means for WEAK (mean = 144.02) and STRONG (mean = 80.06) suggest that CLOs recommended a higher interest rate premium for a client that suffers from weak financial condition. INTEREST for WEAK was significantly greater than the industry average (i.e., 100 basis points, $p < 0.01$) and

INTEREST for STRONG was significantly below the industry average ($p = 0.01$).

5. Summary
In this study, we investigated whether a potential borrower's reporting reputation (objective or aggressive reporting within GAAP) and financial condition (strong or weak) predictably affect CLOs judgments of forecast credibility. Consistent with our expectations, perceived bias was significantly lower if the potential borrower had a reputation for objective reporting or strong financial condition. In addition, in the presence of a reputation for objective reporting, the credibility of the forecast was not contingent upon financial condition. Supplemental analyses suggest that, while CLOs were less willing to pursue the borrower and recommended higher interest rates in the presence of weak financial condition, these recommendations were unaffected by reporting reputation.

We also found that, although a reputation for objective reporting resulted in more credible forecasts, CLOs still perceived forecast bias. Interestingly, perceived forecast bias in the presence of an objective (aggressive) reporting reputation was less than (equal to) that reported by Peters (1999), in which the borrower had not developed a

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[18] We conducted diagnostic tests for each of the three ANOVAs reported in this study to ensure that all assumptions underlying the use of ANOVA were met. Specifically, for all ANOVAs, the Kolmogorov-Smirnov test suggested that the dependent variables were normally distributed within groups and the Bartlett test suggested that variances of the dependent variables were homogeneous across groups. See Neter et al. (1996) and Keppel (1991) for descriptions of the Kolmogorov-Smirnov test and the Bartlett test, respectively.

reporting reputation. These results suggest that, when companies have not yet developed reporting reputations, CLOs discount forecasts *as if* companies are reporting aggressively, with a reputation for objective reporting somewhat reducing perceived forecast bias. Future research can examine the conditions under which companies react to this scepticism by reporting aggressively and whether companies benefit from this aggressive reporting. Specifically, because it is unclear whether analysts are able to remove fully any bias from financial communications (e.g., Brown 1996), companies may be able to benefit from aggressive reporting. Future research also can examine whether users' level of scepticism and ability to adjust forecasts differ across user attributes (e.g., experience, equity vs. debt analyst, etc.) or company attributes.

The results also suggest that, while the CLOs' forecast discounts are a function of both reporting reputation and financial condition, they do not penalise borrowers for aggressive, but allowable, reporting when making loan recommendations. Although forecasts were discounted in the presence of a reputation for aggressive reporting within GAAP, it is possible that the discounts were not sufficiently large to affect willingness to pursue the borrower and the interest rate premium. However, an alternative interpretation is that CLOs do not penalise borrowers for reporting aggressively as long as the aggressive reporting is within GAAP. Future research should examine further the reasons that reporting reputation does not affect CLOs' loan recommendations.

Regardless of the cause, our evidence that, in a loan setting, companies are not penalised for having a reputation for aggressive reporting within GAAP contributes to an understanding of why reporting reputations vary across companies (Lang and Lundholm 1996). That is, although prior research demonstrates economic consequences to aggressive reporting, we identify a context in which there are no economic consequences to aggressive reporting (or benefit for objective reporting). Consequently, our results also raise questions for future research. For example, are there conditions under which a reputation for aggressive reporting, as defined in this study, *does* affect loan recommendations? That is, it is possible that financial condition dominates other potential borrower attributes (e.g., reporting reputation) as long

as financial strength is above or below some threshold. In addition, do companies that develop aggressive reporting reputations tend to finance their operations primarily with debt or equity? The answer to this question could in part be contingent upon whether analysts fully adjust for bias in financial reports. If not, companies that report aggressively may emphasise equity financing because the earnings figures that analysts use for valuation will be biased in the company's favour.

Inevitably, this study includes a number of features that limit its generalisability to natural settings. For example, in actual loan settings, CLOs meet with the potential borrower, CLO recommendations are reviewed by a loan committee, and CLOs obtain more information about the potential borrower. However, we subjected the research case to exhaustive pilot testing to ensure that the materials were realistic and included as much information as possible given the time constraints inherent in conducting an experiment with professionals. Recommendations such as those in this study are important inputs into the loan process and likely affect final loan terms.

Another limitation is associated with the loss of experimental control associated with our method of distributing the cases. However, we are confident that contact people at each bank distributed cases randomly to CLOs with the level of experience required to complete the case. In addition, we saw no evidence that participants did not take the case materials seriously.

Finally, as stated in footnote 16, we measured potential economic consequences of the independent variables in terms of an interest rate premium but not debt covenants, precluding us from examining whether the independent variables may have affected interest rates and debt covenants differently. While we contend that the effect of the independent variables on debt covenants would not differ from the reported results for interest rate premium, prior research has not examined the interaction between interest rates and debt covenants. Specifically, because prior research has not examined simultaneously how creditors adjust interest rates and/or debt covenants in response to risk factors, we suggest that future research examine how risk factors are reflected in the entire package of loan terms (e.g., interest rates, debt covenants).

Appendix

The appendix includes the financial condition (see Panel A) and reporting reputation manipulations (see Panel B) as presented in the experimental materials. In the experimental materials, the presentation of the financial information (including the financial condition manipulation) was followed by the reporting reputation manipulation, projected information from the Corporation (which was the same across all conditions), and debt coverage information.

Panel A: Financial condition manipulations

Strong financial condition:
Selected financial information
Competent analysts from your bank provided you with the following data to summarise important elements of the Corporation's performance and financial position.

		Technology, Inc.		1996 Industry Percentiles		
	1994	1995	1996	10%	–	90%
Earnings before interest & taxes/Sales	8.2%	8.3%	8.1%	6.0%	–	11.0%
Net income/Assets	4.0%	4.3%	4.4%	2.7%	–	4.5%
Current assets/Current liabilities	1.74	1.79	1.85	0.95	–	2.10
Total debt/Total assets	0.40	0.41	0.39	0.74	–	0.40
Debt/Equity	0.67	0.69	0.65	2.85	–	0.67

1994 and 1995 industry ratios approximate those of 1996. The Corporation's ratios suggest that its overall financial condition is weaker than most firms in the industry. The Corporation reported positive cash flows from operations in 1994, 1995 and 1996.

Your bank's computation of debt coverage (presented after reputation manipulation):

	Technology	Industry Percentiles		
		10%	–	90%
Debt coverage ratio	1.63	1.15	–	1.65

Debt coverage is **projected** EBIT plus depreciation divided by the current portion of interest and principal payments on existing and proposed debt as well as capital expenditures in excess of proposed loan proceeds.

Weak financial condition:
Selected financial information
Competent analysts from your bank provided you with the following data to summarise important elements of the Corporation's performance and financial position.

		Technology, Inc.		1996 Industry Percentiles		
	1994	1995	1996	10%	–	90%
Earnings before interest & taxes/Sales	8.2%	8.3%	8.1%	6.0%	–	11.0%
Net Income/Assets	3.1%	2.9%	2.8%	2.7%	–	4.5%
Current assets/Current liabilities	1.37	1.39	1.41	0.95	–	2.10
Total debt/Total assets	0.74	0.75	0.75	0.74	–	0.40
Debt/Equity	2.95	2.98	3.00	2.85	–	0.67

1994 and 1995 industry ratios approximate those of 1996. The Corporation's ratios suggest that its overall financial condition is stronger than most firms in the industry. The Corporation reported positive cash flows from operations in 1994, 1995 and 1996.

[Appendix (*cont'd*)]

Panel A (*cont'd*)
Your bank's computation of debt coverage (presented after reputation manipulation):

		Industry Percentiles		
	Technology	10%	–	90%
Debt coverage ratio	1.16	1.15	–	1.65

Debt coverage is **projected** EBIT plus depreciation divided by the current portion of interest and principal payments on existing and proposed debt as well as capital expenditures in excess of proposed loan proceeds.

Panel B: Reporting reputation manipulations

Aggressive reporting reputation:
Competent analysts within your bank have analysed the Corporation's past projections. The analysts note that the Corporation's projections consistently overstate actual profits as reflected by the audited statements. Colleagues from your bank as well as other analysts that follow the Corporation note that the Corporation has developed a reputation for aggressive reporting and disclosures in both projected and historical financial statements. That is, they perceive that the Corporation follows generally accepted accounting principles, but maximises projected and reported income through its aggressive selection of accounting methods and estimates.

Objective reporting reputation
Competent analysts within your bank have analysed the Corporation's past projections. The analysts note that the Corporation's projections consistently approximate actual profits as reflected by the audited statements. Colleagues from your bank as well as other analysts that follow the Corporation note that the Corporation has developed a reputation for objective reporting and disclosures in both projected and historical financial statements. That is, they perceive that the Corporation follows generally accepted accounting principles and objectively projects and reports income through its unbiased selection of accounting methods and estimates.

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Information content of earnings in an unregulated market: the co-operative cotton mills of Lancashire, 1880–1900

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Abstract—This paper analyses the relationship between earnings and dividend announcements and contemporaneous stock returns. Many previous studies have examined this association, although few address its social and historical context. In late 19th century Lancashire, there was an unusual coincidence of co-operative ownership and the trading of ownership rights on a liquid stock market. Using stock market numbers extracted from the local financial press in conjunction with other relevant archives, this paper examines the usefulness of accounting information provided in circumstances without regulatory duress and where its disclosure was subject to the scrutiny of a well-informed, and socially diverse, shareholding class. Results suggest that employee involvement via ownership rights is likely to improve the information content of accounting reports.

1. Introduction

Summarising two decades of empirical work, Lev (1989: 155) concluded earnings changes and contemporaneous changes in stock prices are but weakly related. He attributed this to the tendency of managerial discretion in accounting practice to undermine the information content of earnings disclosures. In the absence of other mechanisms for disciplining management, it might be inferred from this analysis that regulatory solutions are necessary to make accounting reports useful. However, such a conclusion potentially ignores the contribution of social arrangements in ensuring the usefulness of accounting information. The principle purpose of this paper is to investigate the impact of broad social ownership on the information content of accounting reports. It does so by examining an industry and region, the cotton mills of south-east Lancashire, of global importance during a relatively unregulated period of British corporate history (the period between the 1862 and 1900 Companies Acts).

This examination complements other analyses of

the accounting history of this industry and its region that have considered the social and institutional determinants of accounting disclosure (Toms, 1998a) and of the adoption of accruals accounting and audit (Toms, 2001). Below, two related and alternative hypotheses are examined. First, that the information content of accounting reports is socially determined and thereby reflects governance structures. This is examined through a comparison of the information content of earnings in Lancashire, where shareholder participation was widespread, with the New York stock market in a similar period where market and governance structures discouraged shareholder monitoring. The second, and related, hypothesis is that the earnings-stock price relation is contingent on the state of evolution of financial markets.

The remainder of the paper is structured as follows. The next section discusses the earnings-stock price relationship from the perspective of previous studies, historical and otherwise, addressing the two hypotheses mentioned above. Unusual aspects of the market and financial reporting environment of Lancashire cotton textile firms are then considered. A further section outlines the sample data and research method. The results are then presented and discussed. Finally, conclusions are drawn and suggestions are made for further research.

2. Earnings, share prices and market background

2.1. Accounting numbers, share prices and accounting history

The first quantitative study of the earnings-stock price relation (Ball and Brown, 1968), based on the modern and regulated New York Stock Exchange

(NYSE) found a clear pattern of association between earnings and stock price response. However, it has been argued that the absence of social context in typical subsequent studies in this genre has undermined their research value (Merino et al., 1987). Moreover, as noted earlier, subsequent studies have found weaker empirical evidence for the earnings-stock price relationship (Lev, 1989: 154, 160–1).[1] A further problem is that the strength or otherwise of the relationship depends on the method of modelling investor expectations and responses to changes in earnings. Finally, the majority of these studies have been conducted in the context of regulated markets.

Even so, in a limited number of cases the issue of voluntary financial reporting in unregulated environments has been examined using historical analysis. In some, an agency and transaction cost framework has been used to model incentives for voluntary reporting activities (for example, Watts and Zimmerman, 1983). Although these studies have not examined the information content of reports, they have found only weak empirical support for the agency cost framework (for example, Leftwich et al., 1981). An alternative perspective is to examine the social composition of share ownership and management teams as a basis for disclosure incentive (Toms, 1998a). Extended to information content, the present study also follows this approach.

It might reasonably be expected that historical analysis should feature prominently in empirical accounting research and also that empirical accounting research should feature in accounting history. Such a view would be especially consistent with the time dependency of the event study, the usual tool for investigating the earnings-stock price relationship. In the former case, there are a limited number of US studies that have used historical data, for example Benston (1967), using data from 1926–64, Benston (1969) and Chow (1983) using data from the 1930s, and Sivakumar and Waymire (1993), using data from the 1900s. In all but the latter case, these studies have reflected the tendency, as discussed by Carnegie and Napier

(1996), to concentrate on responses to regulatory developments. There have also been a significant number of US studies that have used historical data to model the long run relationship between earnings and stock prices (for example, Campbell and Schiller, 1988). In the majority of cases, however, econometric work has been devoid of historical analysis (Merino, et al., 1987). At the same time, accounting historians, in the tradition of the historian's craft, have tended to rely on documentary sources. Their approach sometimes reflects a search for the class interests lying behind the manipulation of accounting reports and regulatory changes (for example, Bryer, 1998), or may instead reflect current tendencies in 'new accounting history'. Another reason why historical event studies are not common is the tendency to reject the utilitarian justification of accounting history. According to this view, using historical analysis to address modern accounting problems implies a 'progressive' view of history (Carnegie and Napier, 1996: 13). Meanwhile some specifically British studies have examined the reliability of accounting data in a historical context (for example, Wale, 1990, Arnold 1996). However, none have examined the earnings-stock price relationship and therefore the information content of earnings as market signals. This partly reflects a concentration hitherto on industries that were closely controlled and hence often without the incentive pressures of a capital market.[2]

In the light of these disparate methodological emphases, the current paper, in conjunction with parallel studies (Toms, 1998a, Toms, 2001), attempts to bridge the research traditions of market-based accounting and accounting history. It therefore encompasses documentary and numerical analysis. The earnings-stock price relationship is examined in the context of social changes in the composition of share ownership, as well as institutional changes. Where other studies have examined this relationship historically they have tended to concentrate on the impact of *regulatory* changes (Benston, 1969, Chow, 1983). The rationale of the present study is to examine these relationships in an unregulated market, and therefore consider variables not available to present-day researchers. Its approach is traditional in terms of historical method in that it attempts to identify generalisable causes and effects and to ignore the accidental and the irrelevant. This justifies the use of historical evidence to understand present problems (Carr, 1990: 106–7, Evans, 1997: 134).

One other important previous study (Sivakumar and Waymire, 1993) has attempted an event study with reference to a largely unregulated market, the New York Stock Exchange (NYSE) of 1905–1910. As part of their examination they included a useful analysis of financial reporting in its market con-

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[1] In a summary of US empirical work, 1980–8, Lev reported the typical R^2 as 0.05, regardless of the period of event window. A recent comparable UK study reported an adjusted R^2 of 3.8% (Elsharkawy and Garrod, 1996: 228, equation 1(a)).

[2] Well represented in previous studies of the unregulated late Victorian period are railways (Pollins, 1956; Edwards, 1986; Parker, 1990), coal (Wale, 1990), combined coal and iron companies (for example, Baldwin et al 1992; Baldwin, 1994) and regulated utilities (Parker, 1990; Edwards, 1992). Some of these industries functioned independently of the London capital markets. Families and business dynasties dominated the Boards of Iron and steel companies (Payne, 1967: 522, 534; Jefferys, 1938: 92–3). Although regulated and dependent on London capital markets, railway companies were also often managed at least partly by local capitalists, (Chandler 1990: 254).

text. They tested their assumption that earnings changes accurately classify observations as good or bad news on NYSE data from 1905–1910 and replicated their tests on NYSE firm samples from the period 1985–1990. Similar assumptions are therefore used in the tests carried out below on data from the Lancashire capital market. A comparative analysis is particularly worthwhile in the light of the largely unregulated state of the NYSE of the early 20th century and the similar condition of the South-East Lancashire Stock Market (SELSM)[3] in the late 19th century. This study therefore follows the approach of Sivakumar and Waymire (1993) in terms of explaining the market context, constructing similar tests and comparing results. However, as part of this process, differences in social ownership between NYSE and SELSM are documented and the tests expanded to reflect these contrasts.

2.2. Voluntary disclosure in an early capital market

The significant features of the Lancashire coarse cotton spinning industry in the late nineteenth century, centred on the town of Oldham,[4] were a unique system of governance and the emergence of a liquid equity market (Toms, 1998a: 221). Both were a consequence of more general social developments in 19th century Britain, particularly the influence of co-operative principles as an antidote to the effects of unregulated capitalism in the 1840s and 1850s. The experience of the Rochdale 'pioneers' in distributive co-operatives encouraged similar ventures in cotton textile manufacturing. An important example, the Rochdale Co-operative Manufacturing Society, later known as the Mitchell Hey Spinning Company Ltd was established as a co-operative in 1854. All the promoters were members of the Society, all employees were shareholders and surpluses were paid as a bonus to labour.[5] Six years later the first manufacturing co-operative in Oldham was established. Formed in 1859, as the Oldham Manufacturing and Building Company, it subsequently adopted the name Sun

Mill Spinning Company. Its founders, the members of the Oldham Industrial Co-operative Society, were influenced by idealists such as William Marcroft, and gave the new company a democratic structure designed to foster the principles of producer co-operation and employee control. Management of the company was by means of elected committees, organised in some cases along the lines of responsibility for different parts of the balance sheet, for example the 'Fixed Stock' and 'Saleable Stock' committees (Tyson, 1984–6: 121; Tyson, 1962: 230). This led to the adoption of the one-shareholder-one-vote principle in many similar Oldham companies floated in the 1870s and 1880s, and which survived until the late 1890s.[6] Many features of financial reporting advocated by modern writers (eg Marsh, 1994: 84–9) thought to enhance market efficiency, for example explicit cash flow disclosures, widespread and uniform disclosure, were very prominent in Lancashire up to the last decade of the century. Also, because the 1862 Companies Act offered some advantages to those who floated new concerns and was permissive enough to accommodate co-operative governance structures, adoption of limited liability followed, creating a demand for a share market amongst the working and middle class cotton investors of south east Lancashire.

The functioning of this market has created a historical record of accounting numbers and share prices. From 1862–1900, the firms of the Lancashire cotton industry, as elsewhere, were subject to an essentially permissive regime of financial reporting. In the absence of stipulation as to content, audit and disclosure of accounting information, practice evolved in Lancashire to reflect social changes in industry ownership (Toms, 1998a: 223–4). The SELSM, on which most of the limited Oldham district companies had listings, imposed no requirements on its constituent companies and attempts to formalise the exchange were largely unsuccessful (Thomas, 1973: 149–151). Hence a minority of companies, particularly those more narrowly controlled concerns using high share denominations, published no accounting information at all. These are necessarily excluded from the current study. However, of the 100 or so companies that typically were quoted in the period 1875–1900, some 70%, usually those with a broader shareholder base, voluntarily subjected themselves to public and shareholder scrutiny. The usual practice was to invite the press to attend quarterly meetings

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[3] The term 'market', rather than 'exchange' is used deliberately. Despite attempts to establish an official exchange, promoters of the idea failed to secure permanent premises and succumbed to the tradition of *ad hoc* trading in local hotels (Thomas, 1973: 149–150). A possible reason was that it facilitated the trading of shares in outlying towns and industrial villages. For example, the Oldham practices were copied by the 'Stalybridge Share Market', which carried on in a private house in Stalybridge (*Oldham Standard*, 13th December, 1884).

[4] The Oldham 'limiteds' constituted the most important group of joint-stock *manufacturing* corporations in Britain and were responsible for 12% of the *world's* cotton spinning capacity in 1890 (Farnie, 1982:42). The 'Oldham District' comprised a large area of South East Lancashire (much of present day Greater Manchester) and included Rochdale to the north, Ashton to the south and Middleton to the west.

[5] *Rochdale Observer*, 10th May, 1890.

[6] Democratic voting systems were compatible with Table A in the 1862 Companies Act. The use of graduated voting was quite widespread in the period 1862–1900 (Dunlavy, 1998: 29–32). However, there are no other examples of the 'one shareholder one vote' rule, co-operative principles of member participation and stock market quotation coinciding for such a large number of manufacturing companies.

and to issue them with a published balance sheet. This system of open accountability might have be expected to have contributed to a positive association between accounting earnings and stock price reaction.

Co-operation and a culture of widespread disclosure also influenced the timeliness of accounting announcements in the absence of regulation. A weekly listing of share prices and dividends was published for between 70 and 120 companies. Publication was each Saturday and prices therefore reflected trading that had occurred during the previous week. Profits were computed within the company and were based on the quarterly 'stocktaking'. Results were normally published within two or three days of stocktaking (Thomas, 1973: 152). The profit would usually be discussed at the quarterly shareholders meeting within a week of the stock-taking. Earnings announcements would then follow in the press on the subsequent Saturday. Ownership was diverse and, in the town of Oldham itself, may have been as large as a quarter of the adult population (Farnie, 1979: 261). The small shareholder was the norm, although larger, concentrated shareholdings began to emerge through time.[7] Insider trading rules were non-existent, and such practices were possible and undoubtedly took place. On the one hand, insider traders might have included workers participating in quarterly stock-taking; on the other, they could have been market makers who were also company promoters and multiple directors. The most prominent example was John Bunting, who by 1890, was serving on the board of half a dozen companies and also writing a weekly report on share trading in the *Oldham Standard* (Farnie, 1984–6: 506–7). His column provided readers with details of those companies whose stocks were in or out of favour. Taking these influences together, it might be expected that stock price reaction to accounting announcements would be concentrated in a relatively short period around the announcement date.

The relationship between accounting information releases and stock price reaction was also likely to reflect changes in the balance of power between shareholders and directors. Mill directors were accountable to shareholders as an active group of critics rather than dependent on them for new capital. Most capital was raised at flotation and very little via subsequent share issues. This was because, once built, it was difficult to increase physical plant capacity. In any case the practice was to issue partly paid shares and call (or repay) extra capital as the trade cycle, working capital

position and cash flow demanded (Thomas, 1973: 152–3). Accountability via financial disclosure was therefore to existing shareholders and reflected their continued active involvement in corporate governance (Toms, 1998a: 231–3). Shareholder mistrust of directors was reflected in their demand for regular dividends (Toms, 1994) and directors responded by smoothing dividends in the face of cyclical profit patterns.[8] In view of these expectations both earnings and dividend announcements might be expected to have stock market information content.

Investors were generally well informed and successful in detecting the manipulations of the directors. Extensive press reporting and analysis of results and market conditions potentially created informed expectations about forecast earnings. Prior to 1900, the two local newspapers, the *Oldham Standard* and the *Oldham Chronicle* sent reporters to company meetings in response to shareholder invitation. Quarterly results of companies were tabulated in cross-section from the late 1870s and from 1890,[9] time series analyses, by company and by industry aggregates, were also regularly published. In a strongly cyclical industry accurate forecasting was difficult, although there were many references in press analysis to results above or below expectation.[10] In addition, especially from the late 1880s, detailed market reports were published for the Liverpool cotton futures market and the Manchester yarn market. These markets determined raw cotton purchase prices and yarn sales prices, and, by using futures contracts to cover their position, directors could guarantee average gross margin. It was therefore also easy for even those without access to inside information to compute expected gross profits. Equally easy to forecast was the other main expense, wages, which were subject to industry agreed 'lists' and increasingly 'taken out of competition' by industry federation and trade union agreements from the mid-1880s onwards (Huberman, 1996). Shareholders, as workers at the mills, had good knowledge of stock levels and prices. As a result, much press analysis, and dispute at company meet-

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[7] For example in 1874, 772 shareholders held an average of 18 (£4) shares each in the Moorfield Spinning company. When the Dowry Spinning Company was floated ten years later, 127 shareholders held an average of 94 (£2 10s) shares each (calculated from Smith, 1954: 188).

[8] Oldham earned the nickname 'Diviborough' as a result of the perceived obsession of its people with dividends (Farnie, 1979: 263). Evidence of 'smoothing' behaviour was found in time series tests of the Lintner (1956) model on the profits and dividends of these companies (Toms, 1996: Table 7.9).

[9] In some periods, particularly in the *Oldham Chronicle* of the late 1880s, these were in league table format, usually ranked on the basis of 'profit per spindle' (a recognised standard measure of a unit of capital employed).

[10] There is anecdotal evidence of the transparency of profit expectations. In 1912, when the clique of directors that had taken over Sun Mill refused to publish a balance sheet for the first time in its 53 years as a limited company, local journalists guessed the profit figure with great success, much to the annoyance of the directors (Tyson, 1962).

ings, was devoted to relatively sundry expense items such as coal, oil and tallow. In general, a knowledgeable class of shareholders would be likely to ensure a consistent and positive relationship between earnings announcements and stock prices.

Shareholder scrutiny of directors was exercised through the audit function. There was no legal requirement for an audit, but audits were conducted by volunteer shareholders. Auditors were proficient on the technicalities of production and costs as they were drawn from the local working population (Toms, 1998a, 2001). Social ownership, in particular the close involvement of shareholders who understood the industry through their day to day working experiences, might be expected to reinforce this association. As Ellison reported, 'the daily discussions...as to why dividends are small or large...and the pride which each body of shareholders take in their own mill' (1886: 138), created a state of continual improvement in operational mill efficiency.[11] In a climate of conflict between shareholders and directors, the audit was taken very seriously, as almost a moral duty for the sake of the 'movement' (*Oldham Standard*, 28th February, 1891) and it is likely that the audit function would have lent credibility to earnings announcements. Given these institutional auditing arrangements and shareholder involvement, it might be expected that extensive publication of accounting data and press discussion of accounting results would lead to a closer relationship between earnings and stock prices.

Nonetheless, a problem for the typical investor was the accounting manipulations of directors. Depreciation policy in particular attracted controversy and dispute and manipulations were widespread (Toms, 1998: 225). This reflected the directors' strategy of enhancing earnings and therefore dividends. They had several incentives. Shareholders were prepared to oust a whole board ruthlessly if the balance sheet was unacceptable (Farnie, 1979: 266). Further, where directors also held shares as was common, they could increase their personal income through attempting to inflate selling prices. Companies floated in later booms had relatively few shareholders and a reason for listing was to facilitate exit for the promoters and directors. Hence promoters often sold their holdings after a flotation (Toms, 2001). A large proportion of the profits in the boom of 1907 was distributed as repayments and bonus dividends (Toms, 1998b: 10). As these cliques became more powerful, residual shareholders were less capable of resisting their greater secrecy and accounting manipulations (Toms 1998, 2001). Another possible incentive to inflate earnings follows from research elsewhere suggesting that managers enjoy better relationships and cheaper transaction costs

with stakeholders such as customers, suppliers and employees if they report higher earnings (Burgstahler and Dichev, 1997; Bowen et al., 1995). A final motive consistent with positive accounting theory (Watts and Zimmerman, 1986) was that directors had to maintain the confidence of the loan holders who had the right of instant withdrawal. During the slump of the 1890s, directors of one company visited loan holders personally to persuade them not to withdraw their capital (Tyson, 1962). Although shareholders desired regular dividends, they resisted excessive distributions because they believed excessive dividends weakened the firm's competitive position and increased potential vulnerability to the demands of loan holders (*Oldham Standard*, 28th July, 1888, Toms, 1994: 375). On depreciation, they used their technical knowledge of machine asset lives and information sharing of industry norms as the basis of their arguments (*Oldham Standard*, 10th March 1877, Toms, 2001). Although directors succeeded in their under-depreciation strategy, such manipulations were transparent and systematic across the industry.[12] In these circumstances it might be expected that earnings increases would attract more scepticism than earnings decreases. Also, as the balance shifted towards directors through time, this process was likely to reduce the information content of earnings announcements.

The cotton industry was characterised by boom and slump, and hence different economic conditions prevailed as the system of 'democratic' investment expanded and declined. While booms tended to favour the promotional capitalist, conditions of economic slump such as those experienced in the 1890s, placed strains on the system of shareholder activism. During the 1890–6 slump most companies had adverse balances on reserve. In some cases these balances amounted to several years' worth of average profits, so that there could have been no expectation of a dividend amongst the shareholders.[13] By the 1890s many of the features of financial reporting described above were

[11] This process did not typically incorporate investments in new capital equipment. Instead, rising scale efficiency prompted the erection of newer and larger mills (Wood, 1910: 612–3; Tyson, 1968: 123).

[12] In 1886 a critic of the limited companies presented statistical evidence to a Parliamentary Commission showing that most firms had systematically under-depreciated their assets (*Oldham Standard*, 20th February, 1886).

[13] The sorry state of many companies was revealed by a survey in the *Oldham Standard*, 29th December 1894. The Belgian, Gladstone, Hope and Werneth Cotton Spinning Companies had adverse balances greater than £20,000 (the average subscribed equity capital per company in 1885 was £38,200 (calculated from the appendix data in Smith, 1961: 52–3). From a list of average profits per company for the last 10 years (*Oldham Standard*, ibid), it is also possible to calculate the average profit per company per year as £993 (based on 980 company/years).

moribund, a consequence of the worst slump to effect the industry since the US Civil War and the associated collapse in share values.[14] Share-ownership centralised around cliques, accounting became more secretive, and the stock market became narrower as the proportion of listed companies fell (Toms, 1998a: 226–31).[15] Under such conditions, it might be expected that the information content of earnings announcements would be seriously weakened.

The two main hypotheses examined below follow from the above discussion: that the information content of accounting reports is socially determined and that the earnings-stock price relation is contingent on the state of evolution of financial markets. Accordingly, the tests in the next section were devised to test for information content of accounting information and to test for changes through time in semi-strong form market efficiency.[16] The tests were constructed so that the impact of earnings announcements can be compared to the impact of dividends. As well as examining dividend announcements as a yardstick, it was useful to analyse them in their own right, given their importance to both directors and shareholders. Tests were also developed to examine possible asymmetries between increases and decreases in earnings and dividends. Sensitivity analysis was conducted by varying the length of the event window, changing the model of investor expectations and, especially in view of the reduced activity in the share market of the 1890s, by relaxing assumptions about the statistical distribution of share returns. Finally, the tests were also designed to facilitate comparison with prior studies, principally Sivakumar and Waymire, 1993 (hereafter SW), and hence contrast between the SELSM and the NYSE.

3. Data, sample and method

The discussion above has several implications for empirical testing. This section proposes several

hypotheses and statistical models based on the foregoing narrative. It then examines the methodological issues associated with applying the models using a data set of historical quantitative variables.

3.1. Hypotheses and models tested

On the basis of the discussion in Section 2 above, the following hypotheses were examined.

H1 Abnormal market returns were positively associated with unexpected earnings.

H2 Abnormal market returns were positively associated with unexpected dividends.

H3 Abnormal market returns were more strongly associated with unexpected dividends than unexpected earnings.

H4 Abnormal market returns were more strongly associated with unexpected earnings in the 1880s than in the 1890s.

H5 Abnormal market returns were more strongly associated with unexpected dividends in the 1880s than in the 1890s.

H6 Abnormal market returns were more strongly associated with unexpected earnings decreases than increases.

H7 Abnormal market returns were more strongly associated with unexpected dividend increases than decreases.

Abnormal market returns refer to the shareholder return over and above the average return on the market. Unexpected earnings and dividends refer to the change in earnings or dividend compared to the previous quarter. These hypotheses follow from the salient features of the capital market discussed in Section 2 above. Widespread public disclosure and active shareholder participation at meetings where accounting results were presented might be expected to link earnings announcements to stock market reaction (H1). Similarly, the local obsession with dividends might be expected to link dividends to market reaction (H2). While both types of announcement might be expected to be important, it is also interesting to compare the relative importance of each. Earnings were subject to temporary fluctuations associated with the trade cycle whereas dividends were subject to 'smoothing', hence the hypothesis that dividends provide a better guide to future earnings (H3). Nonetheless, both were potentially subject to managerial manipulation, hence the value of H3 as an empirical test. Another important argument in Section 2 was that the importance of accounting information announcements might be time dependent and related to the different capital market conditions prevailing in the 1880s and 1890s. It is therefore useful to compare the relative importance of earnings (H4) and dividend (H5) announcements during these decades. Finally in the light of the discussion

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[14] A simple average index of 20 Oldham companies, selected from the *Oldham Chronicle* share listing and with a value of 100 at June 1890 had fallen to 50.2, its pre war low, by March 1896. An index for companies quoted on the London stock exchange (Smith and Horne, 1934, columns 1–10: 14–15) showed corresponding figures of 100 and 128.3. See also, 'Is the Cotton Trade Leaving the Country?', *Textile Mercury*, 21 January, 1893: 43.

[15] In the longer run, these changes caused a mis-allocation of capital that undermined the international competitiveness of the industry from 1914 onwards (Toms, 1998b).

[16] The event method conducted here was broadly derivative of the seminal method of Ball and Brown (1968), subject to some variations associated with data limitations. Unlike Ball and Brown this study used a simpler earnings expectation model. This was because the study aimed to compare relative efficiency at two points in time, and not, as with Ball and Brown, to specify the magnitude of the relationship between earnings and share prices.

about director's incentives to overstate profit, the hypotheses also examine the possibility of asymmetric investor reaction to the good and bad news implied by increases and decreases in earnings, with a tendency for increases to have lower information content than decreases (H6). Conversely given the tendency to smooth dividends, shareholder loyalty and the likelihood of stronger investor belief in sustainable cash based announcements there was a possible tendency for dividend increases to have stronger information content than decreases (H7).

To test the hypotheses that accounting announcements have information content (H1, H2 and H3), the following model was tested with the expectation that the co-efficients in the following model are positive and significant:

$$ar_i = \beta_0 + \beta_1 \Delta E_i + \beta_2 \Delta Div_i + e_i \qquad (1)$$

where: ΔE_i = change in earnings per share divided by the share price in the week before the announcement.

ΔDiv_i = change in dividend per share divided by the share price in the week before the announcement.

For the purposes of testing, abnormal return was calculated with reference to week t_0. This was defined as the week the earnings and dividend figures were first published in the *Oldham Standard*. Weekly returns were used to compute abnormal returns. Abnormal return may be measured in circumstances where data availability is restricted by using the market-adjusted return model rather than the market model (Campbell et al., 1997: 156). All the firms were from the same sector of the same industry and were similar in size and product range (Ashton, 1926, Kenny, 1982). Thus co-variances of return might be expected to be similar for each firm against any index based on their average returns or against any external market index. Abnormal return (*ar*) was therefore calculated as the return on the individual security minus the market return, proxied by all the firms in Sample B.[17] If earnings announcements were associated with greater stock market reaction than dividend announcements it is expected that $\beta_1 > \beta_2$ in equation (1) above. Also in order to test their separate impact and to avoid potential multi-collinearity effects in the full model and in models (2) and (3) below, each variable or variable set was deleted from the model in turn.

To examine the possibility that the significance of disclosure of earnings (H4) and dividends (H5)

and information content varied from one decade to another, equation (1) was extended to include interaction dummy variables in the following model:

$$ar_i = \beta_0 + \beta_1 \Delta E_i + \beta_2 \Delta Div_i + \beta_3 \Delta E_i\_YD$$
$$+ \beta_4 \Delta Div_i\_YD + e_i \qquad (2)$$

Where $YD = 1$ if the announcement is in the period 1894/5 and 0 if in the period 1884/5. If announcements had greater impact in the 1880s than the 1890s, it is expected that the coefficients on the interaction dummies will be negative and significant.

To examine the possibility that the market reacted differently to positive and negative earnings news (H6) and dividend news (H7), model (1) was extended to include interaction dummy variables in the following model:

$$ar_i = \beta_0 + \beta_1 \Delta E_i + \beta_2 \Delta E_i\_D_1 + \beta_3 \Delta Div_i$$
$$+ \beta_4 \Delta Div_i\_D_2 + e_i \qquad (3)$$

where: $D_1 = 1$ if earnings increase, 0 otherwise
$D_2 = 1$ if dividends increase, 0 otherwise.

The hypotheses were tested using ordinary least squares regression. Tests of models (1)–(3) were also re-performed to examine the robustness of assumptions about the length of the event window, investor expectations, and statistical distribution of variables.

To extend the tests to a longer event window, the above tests were repeated for the sub sample groups for all weeks between *t–10* and *t+4*. Cumulative abnormal returns were also calculated with reference to the publication date (t_0) of the balance sheet of each company, for a longer event window, *t–10* to *t+4* and for the period immediately surrounding the announcement *t–1*, *t+1*. Cumulative abnormal returns *CAR* for each firm were calculated as the product of $1+ar_i$. The *CARs* were then used as dependent variables in models (1)–(3) above. Natural logs were taken to eliminate the potential effects of the *CARs* being skewed to the right.

Models (1)–(3) above imply that simple change in earnings or dividends against the equivalent benchmark from the prior quarter is a sufficient proxy for shareholder expectations. To examine the sensitivity of this assumption, an alternative expectation model was created. As noted earlier, the press provided a large amount of comparative financial information, such as tables of return to capital. Therefore a model was constructed with reference to the average performance of other quoted companies operating within the local industry. Change in expected profits for each company was determined by computing the average profit to equity capital for the full sample in the current and previous quarters. This average ratio of return to equity was then multiplied by the ac-

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[17] Where *ar* is return for firm *i* minus the average return for the total sample, Q:

$$ar_i = r_i - \left(\frac{1}{Q}\sum_{q=1}^{Q} r_q\right)$$

tual equity capital for each company in the current and previous quarters. The difference was added to or subtracted from the profit of the previous quarter to provide a forecasted expected profit that would be achieved if the firm mimicked exactly the average change in profitability of the whole industry. Expected profit was then subtracted from the actual profit to compute unexpected earnings (*UE*). *UE* was then used as an explanatory variable in models (1) – (3) to explain variation in stock returns over various event windows.

Finally, it was considered important to test the sensitivity of the results from the OLS tests described above to assumptions about the statistical distribution of the data. This was conducted by splitting earnings and dividend changes into sub groups of increases and decreases and into sub groups from the 1880s and 1890s. Mean difference tests were then performed using non-parametric signed rank tests on the abnormal returns of the sub groups.

3.2. Data and sampling issues

A general difficulty in event study research, worth noting at this stage, is the joint hypothesis problem. That is a test of the earnings-stock price relationship either has to pre-suppose an efficient market, or becomes a joint test of market efficiency. The problem is important where little is known about market efficiency from separate research studies, especially in this case where the hypothesis of market efficiency is tested at the same time as a hypothesis that the information content of earnings depended on ownership structure. The usual expectation in the study of emerging stock markets in developing capitalist countries is that efficiency increases through time, for example as a function of institutional development.[18] However, in the Oldham case, the stock market later became moribund due to the condition of the industry after 1914 and by 1931 was an exchange 'in name only' (Thomas, 1973: 161–3). Also, the changes discussed above led to a greater centralisation of share ownership in the 1890s (Toms, 2000). It is therefore equally possible that the market become *less* efficient through time.

The practical consequence is that historical analysis is a necessary accompaniment to the statistical sampling process. Share registers were available for some sample companies and these were examined to provide additional perspective on the timing and frequency of transactions.[19] From the widespread press discussions that took place, there were also a large number of narrative articles from contemporary newspapers and these were used to complement the quantitative analysis. Press and documentary sources have already been used to construct the above discussion on market organisation. They are discussed again in conjunc-

tion with the quantitative empirical testing in the sections below.

For the statistical tests, there was a large data set from which samples could be drawn. There were approximately 50 companies publishing quarterly earnings for a period of over 20 years. The population of earnings changes available for analysis is therefore around 5000. It would have been desirable to use a large sample, if not the full population. However, it is problematic to extract the share price and accounting data from the archival sources. Hence the objective was to obtain sufficient observations to replicate the tests in the SW study. In the SW analysis, the relatively small number of companies quoted on the NYSE, changing listing arrangements and disclosure rules restricted the sample. Their total available sample was 217 annual earnings changes, based on the earnings announcements of 51 companies. Thus the present study aimed to obtain an initial sample of a similar number of quarterly observations.

To best achieve sample sizes comparable to the SW study, from the data available, two nine-month reporting periods were selected. The periods chosen were 1st August 1884 to 30th April 1885, and 1st August 1894 to 30th April 1895. Each sample time period therefore included three quarter-ending reporting dates for each available company. A fourth announcement lagged with reference to the first quarter-end period was added so that three earnings or dividend changes could be calculated for each firm. Each sampling period was selected to represent the contrasting social ownership and governance structures that prevailed in each decade. Thus although each sampling period represents only one year, the sub samples are referred to by decade in the ensuing narrative. At 1st August 1884 there were 90 quoted cotton companies and this had risen to 97 by August 1894. To be included in the sample a firm had to have its results published in the *Oldham Standard* and had to report quarterly rather than half yearly. Also, to ensure that the same firms were included in both sub-samples by decade, the firm had to be trading continuously between 1884 and 1894. Fifty companies satisfied these criteria. Thus there were 150 firm/quarters for each sub-sample decade, making a total sample of 300. Thirteen were deducted as a result of unexplained absences of reported earnings from the *Oldham Standard*. This produced a total sample of 287 firm/quarters.

For these firms, weekly returns were calculated as the difference in share price adjusting for divi-

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[18] For many modern economists, financial markets can only become more efficient, as information flows faster and entry barriers break down. For example, Walter and Smith (1999: 198–200).

[19] These are located in file BT31 at the Public Record Office (PRO) at Kew.

Table 1
Sample characteristics and sample selection

	1884/5	1894/5	Tot.
Sample A (Full sample)	144	143	287
Adjustment for infrequent trading/low values	(13)	(76)	(89)
Sample B (Revised sample)	131	67	198
Analysis of Sample B:			
Earnings increases	74	36	110
Earnings decreases	57	31	88
Sub total	131	67	198
Dividend increases	46	6	52
Dividend decreases	43	12	55
No change	42	49	91
Sub total	131	67	198

dend in the week of the announcement for the period 10 weeks before to four weeks after the announcement.[20] As with NYSE data in the SW study the returns are non-normal. There were several reasons for supposing the 1890s data in particular to be problematic. A large proportion of companies with returns more than three standard deviations from the mean (73 out of 86) were from the 1890s sub-sample.[21] An important reason in many cases was that the shares of the companies concerned had fallen to very low values. In 41% of the 1890s cases where observations were more than three standard deviations from the mean, the shares traded at less than £1.[22] Where shares traded at low values, subsequent increases or decreases in value were usually disproportionately large in percentage terms. Another problem was that, as contemporaries observed, market liquidity reduced as trading conditions worsened. The year 1895 was the fifth of depression. Yet, as early as 1891, the *Oldham Standard* reported that, 'the published list of market prices is not a very reliable guide just now, as they are either nominal or too wide in price to be of practical use' (*Oldham Standard*, 1st August, 1891). This opinion was confirmed by a review of the share registers of participant companies. For example, in 1885 there were 272 transactions in the shares of the Dowry Spinning Company, but only five in 1894. Similarly, for the Thornham Spinning Company, there were 54 transactions in 1884 and 15 in 1894. Furthermore, in the 1890s share price changes did not correspond to actual transactions. An analysis of share price changes in the Thornham Spinning Company for the year ended 30th March 1894 showed that of 16 price changes, only four corresponded to transactions occurring during that week.[23]

It is potentially problematic to rely on such data for statistical testing. Thus for the distribution dependent tests of models (1)–(3) above, observations were removed for companies whose shares were thinly traded or reached very low values, par-

ticularly in the slump of the 1890s. Hence a distinction was made between the full sample (hereafter Sample A, N = 287) and a reduced sample which had thin traded and low value shares removed (hereafter Sample B, N = 198 respectively). Table 1 shows a detailed breakdown of the 198 firm/quarters in Sample B within the samples between increases and decreases in earnings and dividends. Economic conditions dictated this split. In 1884/5 the cotton economy was relatively prosperous, whereas in 1894/5 it was in slump.[24] Earnings therefore generally increased in the first period and fell in the second. Sample A and Sample B were grouped according to earnings changes and then dividend changes. Of the 287 firm/quarters in Sample A, 149 were positive earnings changes and 138 were negative. For the same sample of firm quarters, there were also 57 positive dividend changes and 61 negative dividend changes. In

[20] Share quotations provided the per share current nominal value of share capital and the amount of paid up share capital. Next to the latter figure were two columns of bid/offer spread and an indication of whether that figure represented a premium or discount per share. Share prices could be computed from this information by adding (or subtracting) the premium (or discount) to the paid up share capital. As in other event studies, and to avoid bias when averaging returns across portfolios (Barber and Lyon, 1997), raw returns, rather than log transformations were used. Hence return for firm i for week t is defined as the difference in share price P plus dividend d divided by original share price: $(P_{i,t} + d_{i,t} - P_{i,t-1}) / P_{i,t-1}$.

[21] For sub-samples of firms grouped by time period (ie 1884/5 and 1894/5), Shapiro-Wilk tests on weekly returns reject normality for 89% of companies in the first group and in all cases for the second (at the 0.01 level). For the NYSE, the corresponding result was 92% (i.e. 47 out of 51 firms, SW, 1993: 71).

[22] For example, these included, as at 14th December 1894, Henshaw Street (1s 6d), Garfield (4s), Livingstone (4s).

[23] Annual Returns, PRO (Dowry BT31/37928/16753 and Thornham, BT31/14494/8449).

[24] Previous studies have tended to ignore inter-temporal variations in the earnings/stock price relationship, in particular trade cycle effects and variations in monetary conditions (Lev, 1989: 168–9).

Table 2
Summary statistics

Panel A: Total sample

Variable	N	Mean %	Median %	Stdev %	$ar(t_0)$	Correlation EA	DA
Announcement week abnormal return $(ar(t_0))$	198	0.89	1.11	2.34	1.00		
Earnings change divided by share price (EA)	198	−0.21	0.15	6.77	0.01	1.00	
Dividend change divided by share price (DA)	198	1.35	0.00	1.27	0.41	0.19	1.00

Panel B: 1884/5

Variable	N	Mean %	Median %	Stdev %	$ar(t_0)$	Correlation EA	DA
Announcement week abnormal return $(ar(t_0))$	131	1.03	1.11	2.31	1.00		
Earnings change divided by share price (EA)	131	0.45	0.18	2.65	0.25	1.00	
Dividend change divided by share price (DA)	131	0.21	0.00	1.48	0.48	0.51	1.00

Panel C: 1894/5

Variable	N	Mean %	Median %	Stdev %	$ar(t_0)$	Correlation EA	DA
Announcement week abnormal return $(ar(t_0))$	67	0.62	1.37	2.39	1.00		
Earnings change divided by share price (EA)	67	−1.50	0.07	10.98	−0.12	1.00	
Dividend change divided by share price (DA)	67	−0.02	0.00	0.69	0.18	0.08	1.00

Announcement week abnormal return $(ar(t_0))$ is the market adjusted abnormal return for in the week of earnings publication and dividend announcement. Earnings change divided by share price (ΔE) is the change in earnings per share divided by the share price in the week before the announcement. Dividend change divided by share price (DA) is the change in dividend per share divided by the share price in the week before the announcement.

other cases, dividends were unchanged. The following section reports the results of the analysis of Sample B using distribution dependent tests. Supporting non-parametric tests using Sample A are referred to where appropriate. A full breakdown of Sample B is provided in Table 1. Summary statistics for sample B are shown in Table 2.

4. Results

4.1. Earnings, dividends and stock prices: one-week market reaction tests

Table 3 presents the results of tests on models (1) – (3). A test of model (1) shows that the hypothesis of positive association between abnormal returns and earnings (H1) is not supported but is supported for dividends (H2). Tests on individual earnings and dividend co-efficients confirm this (Panel A, models 1a and 1b). The co-efficient on earnings is insignificant and has the wrong sign (model 1). The F and adjusted R_2 statistics are lowered by the inclusion of the earnings co-efficient and an F test on the marginal effect of deleting

the earnings co-efficient from model (1) was insignificant. This suggests that given a dividend announcement, earnings offered no further information. H3 is therefore supported.

However, these results appear to be time dependent. In tests of model (2) and variants (Panel B) the earnings co-efficient is positive and significant while the earnings interaction year dummy is negative and also significant, suggesting that earnings had greater information content in the 1880s. A test using the earnings co-efficient and earnings dummy alone confirms this (model 2a). Hence H4 is supported. In contrast, models 2 and 2b have insignificant dividend dummies, while the dividend co-efficient is positive and significant. Therefore H5 is rejected. Nonetheless, these results give further support to the hypothesis of stronger association with dividends than earnings (H3) in the sub-periods. As shown by test results for model (2), the deletion of earnings variables from the full model (c/f model 2b) has no effect on adjusted R_2 but reduces the F statistic. F tests on the deletion

Table 3

Panel A: Regression tests of earnings and dividends (Model 1)

$ar_i = \beta_0 + \beta_1 \Delta E_i + \beta_2 \Delta Div_i + e_i$

Model	β_0	β_1	β_2	Adj R^2	F
1[1]	0.0078***	−0.0257	0.7734***	0.161	19.91
	(5.113)	(1.118)	(6.310)		
1a	0.0089***	0.0021		−0.005	0.01
	(5.364)	(0.085)			
1b	0.0079***		0.7471***	0.160	38.52
	(5.174)		(6.207)		

Panel B: Regression tests for the 1884/5 and 1894/5 sub-periods (Model 2)

$ar_i = \beta_0 + \beta_1 \Delta E_i + \beta_2 \Delta Div_i + \beta_3 \Delta E_i YD + \beta_4 \Delta Div_i YD + e_i$

	β_0	β_1	β_2	β_3	β_4	Adj R^2	F
2[1]	0.0077***	0.0039	0.7591***	−0.0319	−0.1040	0.153	9.93
	(4.997)	(0.046)	(5.091)	(0.368)	(0.250)		
2a	0.0082***	0.224***		−0.248***		0.037	4.81
	(4.929)	(2.966)		(3.100)			
2b	0.0079***		0.7613***		−0.1448	0.156	19.24
	(5.139)		(5.992)		(0.356)		
2c	0.0093***	0.217***				0.054	8.48
	(4.687)	(2.913)					
2d	0.0087***	−0.0008	0.754***			0.220	19.37
	(4.810)	(0.001)	(5.333)				

Panel C: Regression tests for asymmetric response to news announcements (Model 3)

$ar_i = \beta_0 + \beta_1 \Delta E_i + \beta_2 \Delta E_i D_1 + \beta_3 \Delta Div_i + \beta_4 \Delta Div_i D_2 + e_i$

	β_0	β_1	β_2	β_3	β_4	Adj R^2	F
3[1]	0.0072***	−0.0168	−0.0629	0.526**	0.400	0.162	10.52
	(3.331)	(0.665)	(0.771)	(2.049)	(1.229)		
3a	0.0082***	−0.0062	0.0585			−0.007	0.79
	(4.066)	(0.227)	(0.676)				
3b	0.0065***			0.4596**	0.4236	0.163	20.18
	(3.428)			(1.833)	(1.306)		
3c	0.0112***	0.530***	−0.734***	0.0022	0.960***	0.280	13.66
	(4.088)	(3.129)	(3.347)	(0.010)	(2.442)		

The dependent variable is the market adjusted abnormal return in the week of earnings publication and dividend announcement.

ΔE_i = change in earnings per share divided by the share price in the week before the announcement.
ΔDiv_i = change in dividend per share divided by the share price in the week before the announcement.
$YD = 1$ if the announcement is in the period 1894/5 and 0 if in the period 1884/5.
$D_1 = 1$ if earnings increase, 0 otherwise, $D_2 = 1$ if dividends increase, 0 otherwise.

N = 198 in all models tested (except models 2c, 2d and 3c, N = 131).
t statistics are in parentheses as calculated from unadjusted standard errors. The Cook-Weisberg test confirmed the absence of heteroscedasticity in all models. *** indicates significant at the 0.01 level, ** significant at the 0.05 level (applying one-tailed tests according to each hypothesis).
Adjusted R^2 is used throughout for consistency. Unlike ordinary R^2, adjusted R^2 can take negative values under certain conditions.
[1] In each panel the marginal effect of including earnings co-efficients was tested by a comparison of models 1–3 with the relevant restricted model using dividend only variables. F statistics were insignificant in all three cases.

of earnings co-efficients on the whole sample and on the 1880s only sub-sample are insignificant. A test on 1880s data alone confirms the significance of earnings in the absence of dividends and the insignificance of earnings when a dividend variable is added (models 2c and 2d). Moreover, earnings and dividend announcements were highly correlated in the 1880s (Table 2, panel B). These results suggest that earnings information was a proxy for dividends when no information about dividends was available. Although earnings had information content in the earlier period, they were a substitute rather than a complement for dividends.

Tests on the effects of positive and negative news confirm the insignificance of earnings in the full period, whether for increases or decreases (Panel C). The earnings increase dummy is negative, but insignificant in model 3 and when tested without the dividend variables in model 3a, suggesting rejection of H6. Dividend change coefficients are consistently significant whilst the dividend increase dummy is consistently insignificant in conjunction with earnings variables or when tested separately (models 3 and 3b). These results suggest rejection of H7. However, tests on 1884/5 data only produce a different interpretation (model 3c). The earnings change variable is significantly positive and the earnings increase variable negative and significant. In contrast the dividend change variable is insignificant although the dividend increase dummy is positive and significant. The negative sign on the earnings increase dummy and the negative net value of the two earnings coefficients when added together, suggest that earnings increases had no information content. Meanwhile, the positive coefficient on the earnings change variable suggests that announcements of earnings decreases did have significant information content. Also the F statistic on the deletion of the earnings variables from 3c is highly significant ($p<0.0000$), suggesting that earnings decrease announcements in this period had information content independent of dividend announcements. H6 is therefore supported for the 1880s sub period only and the acceptance of H4 reinforced. Meanwhile, the significance of dividend increases is confirmed and is particularly pronounced in non-parametric tests.[25] It would appear that dividend increases were a strong inducement for investors to buy, while decreases did not create the

same impetus to sell. H7 is therefore accepted for the 1880s sub-period and there is a caveat to the rejection of H5 for 1880s dividend increases.

Taken together, the results suggested greater average reliance by investors on dividends than on earnings. Also there was considerable variation in the relative importance of earnings between the earlier and later decade. In the 1880s, but not the 1890s, earnings decreases conveyed information to investors over and above dividend announcements.

4.2. Alternative event windows and expectations

Repeated tests on models (1)–(3) with different dependent variables to reflect cumulative returns in varying event windows are used to explore the sensitivity of the results in section 4.1 to new assumptions about the point of dissemination of information to the market. These tests are too numerous to tabulate and in any case tended to produce insignificant results. In general, the longer the event window, the more difficult it is to detect relationships between $CARs$.[26] All models tested are insignificant when $CAR\ t{-}10,\ t{+}4$ is used as the dependent variable. For $CAR\ t{-}1,\ t{+}1$ the results are similar to Table 3 but with generally lower significance of coefficients and models. Information content displays a similar pattern for short and comparable event windows but disappears quickly as the window is extended. Again, earnings variables performed much better on the earlier sample group. The results suggest a relatively short period of price assimilation of accounting announcements.

As with earnings changes and dividend changes, tests using UE showed no information content over longer event windows. In the shorter $t{-}1,\ t{+}1$ window, the earnings surprise model is significant for the 1880s only, although not significantly more so than simple change in earnings.[27] This result nonetheless confirms the relative importance of earnings in the 1880s. Also, the poorer performance of the longer event window tests suggests non-accounting sources of information were less important but that earnings and stock prices were otherwise weakly related.

4.3. Comparisons with the NYSE

It is useful to compare the results in table 3 with

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[25] 91% (significant at the one-sided 0.001 level) of dividend increases for Sample A and 93% (significant at the one-sided 0.001 level) for the 1884/5 sub-group had positive abnormal returns in week t_0. The corresponding figures for earnings were 64% (significant at the one-sided 0.001 level) and 75% (significant at the one-sided 0.001 level). For 1894/5 significance levels for abnormal returns of dividend and earnings increases declined (respectively significant at the one-sided 0.05 level and insignificant).

[26] Individual t-tests for weeks $t{-}10,\ t{-}5$ confirmed the absence of significant relationships between abnormal returns and changes in earnings and dividends.

[27] This was confirmed by tests on the mean abnormal returns of earnings increasing and earnings decreasing sub-samples. The earnings decrease sub sample had significant one-sided mean negative abnormal returns in weeks $t{-}1$ (at the 0.05 level) and $t{+}1$ (at the 0.1 level) using a one-tailed test. Corresponding results for companies with negative UE were significant at the 0.05 and 0.01 levels respectively. For both models, earnings increases and positive UE sub groups had significant mean positive abnormal returns only in week t_0 (at the 0.01 level in both cases).

the similar tests performed on NYSE data in the SW study (1993, Table 4). In comparison to the NYSE, the SELSM earnings for the 1880s only (model 2c) stock price relationship appears relatively strong (for NYSE data the highest adjusted R^2 was 0.034). Earnings change models had a higher adjusted R^2 on SELSM data for all choices of event window where comparison is possible. Again, this conclusion is with reference to the 1880s only. Against the full sample, no favourable comparatives can be made for SELSM. In contrast dividend based models produced similar adjusted R^2 for both markets. It is noteworthy that in tests on NYSE data, dividend decreases were more important whereas increases were more important for SELSM. Again the conclusion is much stronger with reference only to the 1880s. Another contrast was that the shorter the event window, the higher the apparent information content. This trend is apparent for all SELSM models, but not apparent for the NYSE. If the 1880s SELSM data is considered in isolation from the 1890s data, significantly different mean abnormal returns for earnings and dividend increase sub sample groups contrast with the insignificant relationships for the same tests conducted on NYSE data.[28] To summarise these comparisons, for SELSM of the 1880s earnings had apparently higher information content than NYSE, although in both markets dividends had greater information content than earnings.

5. Discussion and conclusions

Two important conclusions are suggested by the above statistical and historical analysis. These are first, that in unregulated markets the earnings-stock price relationship may be governed as much by the character of market participation as size and economic importance, although variations in technical conditions between markets may also play a role. The comparison between SELSM and NYSE suggests differences may be due to the promotion of transparency by public scrutiny at local level on the one hand, while large monopolistic corporations controlled by powerful managerial groups might not necessarily face the same level of accountability on the other.[29] Second, the SELSM evidence suggests that stock markets can become less efficient through time with respect to their ability to process accounting information. This seems to be more likely when markets are unregulated and constituent firms are systematically exposed to long periods of depression in their core product markets. Bearing in mind that both conclusions are tentative and to an extent suggestive of further research, each is now discussed in further detail.

There are three reasons to suppose that social ownership promoted the information content of accounting reports. First, the results from the statistical analysis show that earnings (or at least

earnings decreases) were important to investors on the SELSM in the 1880s, which contrasts with their lack of importance on the NYSE in the period 1905–1910. Second, there was more information content attached to earnings information in the 1880s when the participation of the local community was at its height, than in the 1890s, when such participation was in decline. Third, this view is consistent with the changing pattern of disclosure established in prior research (Toms, 1998a). These arguments imply that active participation by investors was sufficient to promote the economic relevance of earnings announcements. A difficulty in interpreting the results is that such activism also promoted the demand for dividends. Favourable reaction to dividend increases suggests that Oldham's 'diviborough' epithet was well deserved. Shareholder pressure dictated the propensity of firm's to pay out large proportions of their profits as dividends (Toms, 1998a, 1998b) and it is not surprising that earnings announcements acted as substitute rather than a complement dividend information.

Alternatively, it is possible that differences in market structure explain the contrasts between NYSE (SW, pp.66–7) and SELSM. NYSE investors never attached much credibility to earnings as the signal of good and bad news about corporate performance. Yet in many respects, New York was a more advanced market. Trading was continuous (in Lancashire, it was *ad hoc*), and results were disseminated via telegraph prior to press publication (in Lancashire, the press was the only source, other than word of mouth). These factors should have promoted a closer relationship between earnings and stock prices in New York. Their presence, plus the gap between the periods of comparison (1905–1910 vs 1884–5 in Lancashire) in which technical advances in trading mechanisms became available, makes the difference in results for the two markets all the more surprising.

Other technical differences between the markets

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[28] SW, Table 1 reported p-values for mean abnormal returns using two tailed tests. Equivalent one-sided p-values on mean difference of abnormal returns from zero were 0.0865 for earnings increases (SELSM <0.000) and 0.008 for dividend increases (SELSM <0.000). Differences in significance levels were more pronounced on equivalent non-parametric tests (earnings increases 0.230 for NYSE, <0.000 for SELSM; dividend increases 0.276 for NYSE, <0.000 for SELSM).

[29] The Lancashire cotton industry is often depicted as having many hallmarks of perfect competition: very large numbers of relatively small firms in each stage of production; freedom of entry and exit, and prices determined by global supply and demand conditions. For example, 'In the cotton trade the industrial individualism of the 19th century found its most complete expression' (Allen, 1933: 208). In contrast, in New York, it was believed that by the end of the 19th century economic concentration was stifling competition, that managerial power undermined the utility of disclosure, and that this may also have undermined stock market efficiency (Merino and Neimark, 1982: 34–43, but cf. Benston, 1973).

were partly a function of social differences in share ownership and reflected managerial power over shareholders in New York and shareholder power over managers in 1880s Lancashire. Hawkins, (1963: 144) describes several relevant features of the NYSE that provide interesting contrasts with SELSM (Toms, 1998a: 223). External audit was infrequent on the NYSE (in Lancashire, it was quarterly). There were significant lags between year ends and earnings disclosures (in Lancashire, stock-taking was quarterly). Moreover, accounting practices were inconsistently applied in the US. In Lancashire, although earnings manipulation did occur, there was greater transparency. In New York, wrote Adolf Berle in 1927, stockholders were so ignorant that a complete overhaul of the legal system would be necessary to protect them, while another commentator, writing in 1913, argued that investors should follow market prices as a guide to profits (Merino and Neimark, 1982: 39–40). In Lancashire, balance sheets were given a great deal of publicity and analytical attention by expert investors (Toms, 1998a). Overall, reflecting the power of managers and their ability to manipulate earnings, the use of accounting data by participants on the NYSE was more primitive. When Lancashire companies were taken over by cliques of directors after 1900, for example Sun Mill and the companies promoted by Bunting, many of the above features, in particular the quarterly basis of reporting, were quickly abandoned (Toms, 1998a: 229–30; Farnie, 1984–6: 506–7). In this sense, by the 1905–1910 period, Lancashire had become much more like New York.

In doing so, as the test results suggest, the SELSM was becoming a less efficient processor of published accounting information. The changes observed in the SELSM between 1885 and 1895 confirm that extensive disclosure of accounting information cannot be a sufficient condition for semi-strong market efficiency. Similarly, democratic participation and shareholder activism were not sufficient in themselves to promote market efficiency, since the trend to a less efficient market was strongly associated with the slump conditions of the early 1890s, which occurred prior to the demise of the democratic system and the decline in financial disclosure. Because many companies had accumulated large adverse balances by the mid-1890s, thereby presenting the investor with call risk and a low probability of dividends, their shares became increasingly un-saleable even at very low values. Thin trading prevented the market from providing its basic function of matching buyers and sellers. Clearly this was in part attributable to the unusual influences of trends in the world cotton economy of the 1890s and the dependence of SELSM on a single industry. Nonetheless, although SELSM had become much

less efficient by 1895, some interesting contrasts remain between the SELSM of the 1880s and the NYSE.

Problems of thin trading particularly during crashes and severe bear conditions can be a feature of any stock market. The slump in values on SELSM may also explain much accounting change, and indeed the ultimate demise of the 'democratic investment' system in Lancashire, although further research is required in this area. From a methodological point of view this study shows that the joint hypothesis problem is potentially resolvable by historical analysis and recourse to non-numerical evidence. As well as simply testing for market efficiency, such an approach allows the investigator to look behind technical market conditions for the reasons why accounting disclosures might (or might not) have information content.

In summary, the evidence presented has shown that social conditions, manifested in the capacity and preparedness of active shareholders to monitor managers, can promote the information content, and hence the utility, of accounting reports. The ability of shareholders to engage in these activities is crucial to the modern debate on corporate governance, and unlike in 19th century Lancashire, can only be pursued through regulation. Nonetheless, there are useful lessons to be learned from the case, not least that where capital markets are concerned, history does not always operate on a straight line of improving efficiency.

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Reverse stock splits and earnings performance

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Abstract—This paper presents evidence that reverse stock splits are preceded by significantly poorer earnings performance for splitting firms compared to a sample of matched control firms. Interestingly, the overall earnings-returns relationship becomes significantly stronger following the reverse stock split. I interpret this as evidence that reverse splits communicate to market participants that sub-par earnings performance before the split is not transitory and that it is expected to persist in the future. Together, the evidence in this paper provides an explanation as to why reverse splits, which are employed for reasons that are seemingly beneficial to shareholders, are assessed negatively, on balance, by market participants.

1. Introduction

Reverse stock splits are essentially paper transactions that, outside their transaction costs, do not alter a firm's stream of cash flows directly. Yet, reverse splits have been employed by public firms for several decades. Academics in accounting and finance have puzzled over their existence since, much like regular splits, reverse splits do not change the proportional ownership of shareholders and are costly to execute. Fundamentally, the reasons for the reverse-split decision are currently not well understood.[1]

Much prior research has examined ordinary stock splits. The consensus is that split announcements elicit a favourable stock market response (e.g., Fama et al. (1969) and Grinblatt et al. (1984)). First, the positive stock market response has been explained by the adjustment of the stock price to a more attractive trading range. This optimal trading range hypothesis is empirically supported, for example, by Lakonishok and Lev (1987). Second, the positive market response has been explained by an information-signalling hypothesis according to which stock splits signal earnings quality. Specifically, Asquith et al. (1989) find that splitting firms have superior earnings performance in the years before (but not after) the split. The stock split itself conveys to the market that the favourable pre-split earnings performance

is not temporary and will persist in the post-split years.

By contrast, the announcement of reverse splits has been found to elicit a negative stock market response (Woolridge and Chamber (1983)). Possible motives behind the adoption of reverse splits are 1) a desire to move the share price to an optimal trading range, 2) a reduction in shareholder servicing costs, and 3) improvement of the stock's image among investors. In line with the trading range explanation for reverse splits, Han (1995) documents improvements in liquidity for a sample of reverse-splitting firms. Present explanations for reverse splits, however, contrast the observed negative market reaction at the split announcement. That is, since improved liquidity, a better company image, and lower servicing costs are likely beneficial to the firm, why does the market react negatively to the reverse split announcement?

This study offers a possible explanation for the negative assessment of reverse stock splits. Following Asquith et al. (1989) this study posits that, like regular stock splits, reverse stock splits also convey information about the permanence of pre-split earnings. Specifically, following a reverse split market participants become more knowledgeable about the firm's true worth which enhances their ability to value the firm's earnings information. Employing a sample of 213 matched pairs of reverse-splitting firms, the empirical results suggest that pre-split earnings and returns are significantly negative. In line with expectations,

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[1] In a reverse stock split, the firm consolidates its shares into fewer shares of a higher nominal value. In effect, the nominal value of each share increases by a factor *m* (the reverse stock split factor) while the number of outstanding shares decreases by the same factor. A reverse split is a paper transaction; i.e., no money changes hands and the book value of equity remains the same.

the earnings-returns relation is found to become significantly stronger after the split, consistent with the reverse split enhancing the information content of earnings. This evidence is consistent with investors reassessing the degree of permanence in pre-split earnings (losses) in the backdrop of the unfavourable signal conveyed by the reverse split.

The remainder of the paper is organised as follows: Section 2 discusses the testable hypotheses, Section 3 describes the data and methodology, Section 4 presents the empirical results, and Section 5 summarises and concludes.

2. Hypotheses development

In an ordinary stock split, which is essentially a mirror image of a reverse split, management artificially lowers the share price, conveying a message it can withstand the resulting price decrease. An ordinary split is therefore more likely in the presence of rising share prices before the split, that are likely to be associated with superior pre-split earnings performance. Consistent with this notion, Asquith et al. (1989) document evidence about regular stock splits being preceded by superior pre-split earnings performance even after adjusting for contemporaneous industry performance.

An analogous argument may well apply to reverse stock splits: Specifically, an interesting implication of the optimal trading range explanation for reverse splits is that by reverse-splitting their stock, managers concede that they do not expect the stock price to rise on its own, at least not up to the optimal trading range based on their private information. Therefore, a reverse split is necessary to achieve a higher share price. Similarly, if a higher share price is associated with a better company image and increased liquidity, a reverse split constitutes admittance that prestige and liquidity have to be attained through an artificial increase in the stock's nominal value. Given this, it is plausible to argue that 'bad things' would have to happen before a firm is forced to employ a split to raise its stock price. More specifically, it is likely that company performance is poor in the periods leading to the reverse split, rendering it a necessity. Therefore, reverse-splitting firms are expected to have performed poorly in the pre-split years, as reflected in their lower pre-split earnings figures. The first research hypothesis is as follows:

H1: Reverse-splitting firms experience inferior earnings performance in the pre-split period compared to a sample of matched control firms.

In valuing a firm, investors place greater emphasis on the component of earnings that is permanent and expected to persist in the future, compared to the transitory component which is specific to the time period(s) being considered. Therefore, given

earnings, the degree of earnings permanence affects the sensitivity of stock prices to earnings information. However, the permanent and transitory earnings components are not directly observable by investors who usually infer that extreme earnings figures, whether large gains or large losses, have a significant temporary component, and will revert to more moderate amounts in the future. This is why extreme gains and extreme losses usually elicit a relatively weaker stock market response. Similar behaviour is expected prior to a reverse stock split; i.e., investors discount the significance of (react weakly to) pre-split losses probably because they expect these losses to have a larger transitory component.

Notably, management has an advantage in separating the temporary and permanent earnings components because of privileged private information. Investors who are at an informational disadvantage may exploit the reverse split as a signal about the breakdown between (unobserved) permanent and transitory earnings components. Therefore, following the reverse split, as is the case for regular stock splits, the information asymmetry gap between management and investors is narrowed as investors realise that 'abnormal' pre-split earnings performance is not transitory but that it is likely to persist. Specifically, investors realise that management does not expect firm performance to improve (i.e., revert to the mean); therefore, a reverse split is necessary in order to shift the stock price to an optimal trading range. As a result, the association between earnings information and stock returns is expected to be stronger in the years immediately following the reverse stock split. The reason is that, given the same level of poor post-split performance as in the pre-split period investors 'read' a higher degree of permanence in such unfavourable information in the backdrop of the negative signal conveyed by the reverse split. The point is, a reverse split illuminates the firm's financial status and assists investors in valuing earnings information more appropriately.

Moreover, the enhancement of the information content of post-split earnings is unlikely to be symmetric. Hayn (1995) reports that losses have a lower information content than earnings because when losses persist shareholders have the option to liquidate. Therefore, losses will not persist in perpetuity. Controlling for the difference in informativeness between gains and losses, investors will be more responsive to negative post-split information (i.e., to losses) since that is what is being reinforced by the reverse stock split. Therefore, the hypothesised increase in the post-split information content of earnings is likely to be more pronounced for reported losses than for gains. In testing the notion that reverse splits convey information on the permanence of pre-split earnings in general, and

losses in particular, a second hypothesis is empirically tested as follows:

H2: The association between annual earnings (positive or negative) and stock returns for reverse-splitting firms becomes significantly stronger in the years following the reverse stock split.

H2a: The association between annual losses and stock returns becomes significantly stronger in the years following the reverse stock split.

3. Data

The search for firms announcing reverse stock splits covers the period from 1985 to 1993. *The Wall Street Journal Index* was scanned over that period through key phrase searches such as 're-verse split' and 'reverse stock split' in order to identify candidate reverse-splitting firms. This initial search resulted in identification of 251 firm-announcements. In order for firms to be included in the final sample, two screening criteria were also applied as follows: 1) splitting firms had to be incorporated in the US, and 2) splitting firms had to be listed on the 1997 version of the Compustat

database (either in the active or the research file). These screening criteria reduced the sample to 229 firm-announcements.

The performance of firms is likely to be influenced by their size and industry affiliation. Accordingly, in assessing the operating performance and other pre-split characteristics of the reverse-splitting (experimental) firms, the characteristics of a sample of matched control firms over the same time period is used as a benchmark. Comparisons to matched control firms have been chosen over comparisons to industry benchmarks since reverse-splitting firms are significantly smaller than the average Compustat firm; employing industry-based comparisons would therefore entail a substantial size bias. Each experimental firm is matched to a control firm in the same four-digit SIC code and with sales in the pre-split year as close to experimental firm sales as possible. At a minimum, a three-digit SIC code match and a ratio of experimental to control firm sales between 0.25 and 4.00 was required for a match to be made. In 16 cases it was not possible to obtain a control firm that met these matching criteria. This reduced the final sample used in the subsequent empirical analysis to 213 matched pairs of firms.

The distribution of reverse splits across two-

Table 1
SIC and time distribution of 213 firms reverse-splitting their stock between 1985 and 1993

	2-digit SIC	1985	1986	1987	1988	1989	1990	1991	1992	1993	Total	Freq.
Oil and Gas	13	3	2	1	3	2	3	5	6	4	29	13.6
Construction	15–16	1	–	1	–	–	–	–	–	–	2	0.9
Food products	20	–	–	3	–	–	–	–	1	–	4	1.9
Clothing	23	–	–	1	–	–	–	–	1	–	2	0.9
Paper products	24–27	–	2	1	–	1	1	–	1	1	7	3.3
Chemical products	28	–	1	1	1	–	2	1	3	–	9	4.2
Manufacturing	30–34	–	–	2	1	1	1	2	–	–	7	3.2
Computer equipment and services	35,73	1	3	3	–	5	5	6	9	3	35	16.4
Electronic equipment	36	–	1	1	–	1	1	1	3	3	11	5.2
Transportation	37,39–48	1	–	1	–	–	4	1	4	4	15	7.0
Scientific instruments	38	–	1	3	–	2	1	5	5	2	19	8.9
Durable goods	50	–	–	–	–	2	1	6	1	1	11	5.2
Non-durable goods	51	1	–	1	1	–	1	–	1	–	5	2.3
Retail	52–59	–	–	2	1	–	2	1	–	1	7	3.2
Financial services	60–69	2	1	2	–	4	6	2	5	1	23	10.8
Entertainment services	70,78,79	1	–	–	–	–	1	–	4	1	7	3.2
Health services	80,87	1	1	2	–	1	1	4	1	1	12	6.1
All others (10, 14, 22, 49, 75, 99)	–	1	–	–	–	2	–	4	1	8	3.7
Total		**11**	**13**	**25**	**7**	**19**	**32**	**34**	**49**	**23**	**213**	**100.0**

Table 2

Profile comparison of 213 pairs of reverse-splitting and matched control firms in the year prior to the reverse split

Each control firm is matched to an experimental firm based on two-digit SIC or better and firm sales. The dividend payout dummy is set to one for firms paying a dividend and zero otherwise. All financial data are collected from COMPUSTAT for the last fiscal year end prior to the reverse split except for the post-split share price which is measured at the end of the first full year after the reverse split.

Variable name		Reverse-splitting firms	Control firms	Mean Difference	Paired-t (χ^2)	Wilcoxon Z
Number of firms		213	213			
Reverse split factor	Mean	22.81				3.90***
	Median	5.00				
Pre-split share price	Mean	2.65	8.07	−5.42	−7.85***	−10.15**
	Median	1.13	4.50			
Post-split share price	Mean	10.97	8.58	2.39	0.69	1.75*
	Median	3.82	11.34			
Dividend pay-out dummy	Pct.	7.6%	18.9%	−11.3%	(3.49)*	−
Total assets (in $millions)	Mean	183.4	537.4	−354.0	−1.16	−1.33
	Median	17.8	23.7			
Total liabilities/ total assets	Mean	0.556	0.491	0.065	1.95*	1.76*
	Median	0.575	0.511			
No. of shareholders (in millions)	Mean	5.109	3.544	1.565	1.18	3.67***
	Median	1.589	0.980			

*, **, ***, significant at the 0.10, 0.05, and 0.01 levels respectively.

digit industry codes and through time is presented in Table 1. In general, there does not appear to be significant clustering of events across industries. The most highly represented industries are computer equipment and services (16.4%), oil and gas (13.6%), and financial services (10.8%). All tests in this paper were repeated after excluding the 23 pairs of firms that belonged to the financial sector (SIC codes 6000–6999) given that the special regulatory environment of financial firms could confound the results. The basic inferences of the paper are not affected by the treatment of financial firms.

In time, the number of events varies from seven (3.3%) in 1988 to 49 (23.0%) in 1992. Overall, there appears to be no clustering of the data in any single year, even though most reverse splits occur in the second half of the sample period. The empirical analysis begins with 213 matched pairs of firms. The number of firms used in the tests declines as the time period analysed is extended, year by year, up to three years before to three years after the reverse split due to data unavailability for either the experimental or the control firm on Compustat. Sample firms with incomplete data in some years were kept in the sample given the relative difficulty of collecting a large-enough sample of reverse-splitting firms. While missing data may suggest a selection bias in the results (since

firms with missing data may be poor performers being delisted), control firms are subject to the same bias; therefore, inferences drawn based on benchmark comparisons are immune to this bias.

Table 2 presents descriptive statistics for the reverse splitting and control firms. The two groups are similar in terms of size as measured by total assets at the start of the reverse split year. Also, reverse-splitting firms are marginally more leveraged (i.e., they have a higher ratio of total liabilities to total assets). The median split factor is 5:1, the factors ranging from 1000:1 to 2:1. Interestingly, at the end of the fiscal year before the split share prices are significantly lower for reverse-splitting firms compared to control firms (the mean prices are 2.65 and 8.07 respectively), highlighting the importance of reverse splits in bringing share prices to a more attractive trading range. In line with this explanation, at the end of the first full year after the split the mean share price rises to 10.97 for reverse-splitting firms compared to 8.58 for the control firms. It should be noted that some stock exchanges, such as Nasdaq, have a minimum price requirement for listed stocks. A reverse stock split may therefore serve as one mechanism employed by management to side-step this restriction and continue to be listed. The descriptive evidence on this sample presented in Table 2 suggests that sev-

eral of the firms examined in this study are likely to face this restriction, based on their particularly low stock prices before the split. However, firms are not forced to disclose whether such a restriction has motivated their decision and so it is not feasible to separate voluntary from forced reverse splits. Regardless of whether this mundane explanation for reverse splits is in effect or not, reverse splits are likely to serve as involuntary signals because of their negative information content regarding firm value. Thus, the arguments developed about their existence in Section 2 are likely to hold even when splits are driven by exchange listing requirements.

Two other differences between the reverse splitting and control firms are worth noting. First, experimental firms rarely pay dividends; the pay-out rate (the number of reverse-splitting firms with non-zero dividends) is less than half compared to the rate for control firms, the pay-out rates being 7.6% and 18.9% respectively. Second, experimental firms have a significantly greater median number of shareholders than control firms in the year before the reverse split (1.59m. compared to 0.98m. with a Wilcoxon Z-statistic of 3.67). This difference is consistent with the notion that reverse splits are partly intended to reduce shareholder servicing costs by reducing the number of outstanding shares and the number of shareholders.

4. Methodology and empirical results

The first hypothesis states that reverse-splitting firms are outperformed by control firms in the pre-split period. Two alternative variables are used in measuring the earnings performance of firms in the years surrounding the reverse split: net income divided by total assets at the start of the year (ROA) and primary earnings per share before extraordinary items (EPS). Moreover, in order to assess the stock performance of firms around the reverse split, 12-month stock returns are computed for each of the seven years surrounding the split (from year −3 to year +3 where year 0 is the reverse split year).[2]

Annual stock return is measured as the share

price at fiscal year end, minus the share price at the start of the fiscal year, plus dividends per share, all divided by the share price at the end of the previous year. The 'abnormal' return on assets $(AROA_t)$ is estimated as $ROA_t - CROA_t$, where ROA_t is the splitting firm's ROA in year t relative to the splitting year (t=0), and CROAt is the matched control firm's ROA for that year. The control firm-adjusted earnings per share and stock return are computed using the same method.

Statistical differences in the performance of experimental and control firms for each sample year are assessed using the non-parametric Wilcoxon matched pairs signed-ranks test and a sign test (two-tailed), since the distribution of earnings is highly leptokyrtic, and in the case of parametric tests the results would be unduly influenced by numerous extreme observations. The null hypothesis is that control firm-adjusted performance is not significantly different from zero for each of the sample years surrounding the reverse split.

Potential changes in performance from period to period may be confounded by size- and industry-related factors as opposed to firm-specific reasons. In order to distinguish between the two, changes in the performance of firms are examined net of the performance of the matched control firms. For example, in assessing the change in the difference between experimental and control firm ROA from year −1 to year 0 (the change in the abnormal return on assets), a new variable is constructed such that

$$\Delta ROA_{(-1, 0)} = AROA_0 - AROA_{-1}$$

Changes in EPS over various windows are similarly computed. The null hypothesis of no performance change is tested using the non-parametric Wilcoxon signed ranks test (two-tailed) described above. In both tests of differences in performance between splitting and control firms over a single period, and in tests of changes in performance, median values are presented together with the p-values corresponding to the Wilcoxon signed ranks test and the number of positive/ negative observations.

Table 3 presents evidence on the performance of reverse-splitting firms in the seven years surrounding the reverse split decision. Performance is measured by annual stock returns, both raw and net of the corresponding control firm's return, and by earnings (ROA and EPS as previously defined, both net of the corresponding control firm figures). Annual stock return over the fiscal year is measured as the share price at fiscal year end minus the share price at the start of the year plus dividends per share, all divided by the share price at the beginning of the year. It should be noted that this measurement window assumes public availability of earnings information by the end of the fiscal

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[2] The examination of earnings performance in the three years following the reverse stock split would be consistent with reverse splits revealing management's expectations about future earnings which, based on the market reaction to the split announcement, should be unfavourable. Several previous studies have documented significant earnings changes following other corporate transactions with the market (see, for example, Dann, Masulis, and Mayers (1991) Bartov (1991) and Healy and Palepu (1988)). Their results are consistent with an earnings-signalling hypothesis according to which post-event earnings changes are 'foretold' to market participants by better informed managers. These tests assume that annual earnings follows a random walk (Ball and Watts, 1972) and that deviations from zero changes in post-event earnings reveal systematic information that is contained in these decisions.

Table 3
Performance of firms announcing a reverse stock split between 1985 and 1993 compared to a sample of industry- and sales-matched control firms

The reverse split announcement is made in year zero. The first row indicates the variable median; the second row reports the p-value for the Wilcoxon matched-pairs signed ranks test; the third row reports the number of positive-negative observations (asterisks denote statistical significance according to the sign test). Raw return is annual stock return over the fiscal year measured as the share price at fiscal year end minus the share price at the start of the year plus dividends per share, all divided by the price at the beginning of the year. Return on assets is asset-scaled net income. EPS is primary earnings per share before extraordinary items. Adjusted stock return, return on assets, and earnings per share (EPS) are control firm-adjusted (i.e., they are calculated after subtracting the corresponding control firm values).

Year	Raw return	Adjusted return	Return on assets	EPS
−3	−23.23%	−19.90%	−2.5%	−0.200
	0.002***	0.108	0.004***	0.012**
	39:89***	38:53	55:93***	60:85
−2	−11.11%	−3.11%	−2.4%	−0.05
	0.042**	0.708	0.009***	0.053*
	55:89***	56:60	70:110***	78:95
−1	−12.50%	−2.03%	−3.3%	−0.10
	0.010**	0.029**	0.002***	0.014***
	60:109***	56:84**	82:123***	89:110
0	−23.26%	−26.10%	−1.4%	−0.07
	0.003***	0.002***	0.149	0.098*
	61:123***	60:110***	89:105	88:102
+1	−4.55%	−3.09%	−1.8%	−0.09
	0.805	0.462	0.054*	0.119
	86:99	80:86	74:100*	80:94
+2	−8.33%	−9.20%	−0.7%	−0.14
	0.513	0.236	0.103	0.046**
	86:99*	65:82	69:80	63:88*
+3	−2.89%	−2.72%	−2.6%	−0.11
	0.977	0.306	0.094*	0.121
	68:82	53:61	46:70*	50:64

*,**,*** significant at the 0.10, 0.05, and 0.01 levels respectively.

year (and not three months after the fiscal year end when the reports are usually published). To the extent there is a lag in the dissemination of accounting information after the fiscal year, noise would be added to the earnings usefulness measure. This implicit assumption, which is necessary because of data unavailability of monthly returns for most of these reverse-splitting firms on Compustat, is likely to work *against* the hypotheses stated in this paper.

First, the median raw stock return for reverse-splitting firms is negative in the three pre-split years. Negative returns are statistically significant at the 0.05 level or better in all three years under both the Wilcoxon signed ranks test and under the sign test. The stock return in the event year is significantly negative, consistent with evidence documented previously by event studies. Last, raw stock returns are indistinguishable from zero in each of the three post-split sample years. Adjusting

for control firm returns reduces pre-split return losses for the reverse-splitting firms. Nevertheless, adjusted returns are negative and significant in the year prior to and the year of the reverse split. Therefore at least some, but not all, of the poor pre-split performance can be attributed to size and/or industry factors. Also in line with evidence on raw returns, control firm-adjusted returns in the three years following the reverse split are indistinguishable from zero.

Asset-scaled net income (ROA) is significantly lower for experimental compared to control firms for each of the three years before the split; the difference is significant at the 0.01 level or better for all three years under both tests performed. This result is consistent with the study's first hypothesis expecting poor pre-split earnings performance for reverse-splitting firms. In subsequent years, empirical tests reveal statistical differences in earnings

Table 4
Earnings performance of firms announcing a reverse stock split between 1985 and 1993 compared to a sample of industry- and size-matched control firms

Return on assets (ROA) is asset-scaled net income. EPS is primary earnings per share before extraordinary items. Unadjusted change refers to the raw variable change for reverse splitting firms. Control firm-adjusted change refers to the raw variable change for the experimental firm minus the change in that variable for the control firm over the same time period. The reverse split announcement is made in year zero. For each cell the first line refers to the median change in the variable, the second line to the p-value for the corresponding Wilcoxon signed ranks test, and the third line to the number of positive and negative observations (asterisks in the third line refer to statistical significance according to the sign test).

Year	Unadjusted changes		Control firm-adjusted changes	
	ROA	EPS	ROA	EPS
−3 to −2	−0.1%	0.0	−0.3%	0.0
	0.812	0.596	0.978	0.651
	85:86	83:89	69:76	71:71
−2 to −1	−0.4%	0.0	−0.3%	−0.01
	0.286	0.393	0.295	0.658
	83:104	92:94	87:90	82:88
−1 to 0	−0.1%	0.02	1.8%	−0.02
	0.897	0.183	0.172	0.511
	98:100	102:89	107:87	96:92
0 to 1	−0.5%	0.05	−0.2%	0.03
	0.330	0.027**	0.847	0.270
	82:96	100:79*	86:88	88:86
1 to 2	−0.8%	0.05	−0.9%	0.02
	0.061*	0.317	0.179	0.824
	72:92	93:73	67:82	76:65
2 to 3	−0.6%	0.03	−1.9%	0.01
	0.408	0.179	0.395	0.429
	62:73	76:88	43:65**	57:53

*,**,*** significant at the 0.10, 0.05, and 0.01 levels respectively.

performance between experimental and control firms in years +1 and +3. Nevertheless, the median control firm-adjusted ROA is negative throughout the sample period. Similar albeit more modest results are produced by EPS comparisons. In the pre-split years, EPS performance of reverse-splitting firms is significantly lower than that for the respective control firms for each year separately at the 0.10 level or better, also consistent with hypothesis one. Post-split EPS differences remain negative and are weakly significant in years 0 and +2. In sum, the evidence from Table 3 is in line with reverse-splitting firms performing worse than their industry counterparts in the years before the reverse split.[3]

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[3] To examine sensitivity of the results in Table 3 to the goodness-of-fit between experimental and control firms, the tests were re-estimated after excluding pairs of firms with a sales ratio in the highest and lowest quintiles. The major results persist (i.e., reverse-splitting firms are outperformed by their industry counterparts in the pre-split period).

Tests of the post-split performance changes of reverse-splitting firms are presented in Table 4. Specifically, the significance of one-year changes in asset-scaled net income and EPS is assessed for each year by comparing each variable to its corresponding value in the subsequent year. The results uniformly reveal that there are no statistical differences in performance following the reverse stock split, inconsistent with reverse splits signalling information on future performance. This result holds for both the return on assets and earnings per share variables. Moreover, adjusting ROA and EPS for simultaneous performance changes in the control firms also fails to discern significant post-split performance changes. Furthermore, measuring variable changes over wider windows (results not tabulated) does not alter the substance of the results. Finally, these results are similar under the Wilcoxon signed ranks test and the sign test. Taken together, the results in Table 4 fail to provide support for the notion that reverse-splits con-

Table 5
The Rank association between stock returns and earnings for 213 firms reverse-splitting their stock between 1985–1993

Earnings (NI) is net income deflated by beginning-of-the-year book value of equity. The change in earnings is net income of the current minus net income of the prior year, all divided by beginning-of-the-year book value of equity. The dependent variable RET is stock return over the fiscal year measured as the share price at fiscal year end minus the share price at the start of the year plus dividends per share, all divided by the share price at the beginning of the year. The two models on the right hand columns are estimated employing sub-samples of negative (NI<0) and positive (NI>0) earnings levels. POSTSPLIT is a binary variable that equals one if the year is after the split and zero otherwise. The dependent variable and the independent variables are all converted to ranks. t statistics are in parentheses.

$$RET = \beta_0 + \beta_1 NI + \beta_2 \Delta NI + \beta_3 NI*POSTSPLIT + \beta_4 \Delta NI*POSTSPLIT$$

	All firms	All firms	NI < 0	NI > 0
β_0	370.31	336.40	191.20	186.60
	(17.73)***	(15.17)***	(11.08)***	(10.20)***
β_1	0.205	0.110	0.122	0.013
	(6.67)***	(2.53)**	(2.52)***	(0.30)
β_2	0.082	0.025	–0.026	0.104
	(2.67)***	(0.59)	(–0.43)	(1.82)*
β_3		0.129	0.136	0.067
		(2.93)***	(2.52)**	(1.43)
β_4		0.076	–0.002	0.120
		(1.77)*	(–0.04)	(2.04)**
Adjusted R^2	7.3%	8.7%	3.9%	6.0%
Sample size	1,062	1,062	499	.561
F-value	42.5***	26.3***	5.98***	9.87***

*,**,***, significant at the 0.10, 0.05, and 0.01 level respectively.

tain negative information about future earnings.

Next, the tests focus on the study's second hypothesis. In order to test for changes in the association between earnings and stock returns, earnings is defined as net income deflated by beginning-of-the-period book value of equity (NI). Using total assets as a deflator provided qualitatively similar results. Ordinary Least Squares regressions are estimated on the relationship between earnings and stock returns for the sample of reverse-splitting firms as follows:

$$RET_{it} = a_0 + b_1 NI_{it} + b_2 \Delta NI_{it} + \qquad [1]$$
$$b_3 NI*POSTSPLIT_{it} + b_4 \Delta NI_{it}*POSTSPLIT_{it}$$

where $POSTSPLIT_{it}$ is a binary variable that equals one for the post-split years and zero otherwise. NI*POSTSPLIT and ΔNI*POSTSPLIT are the variables of interest and are expected to be positive, statistically significant, signifying a higher association between earnings levels and earnings changes with stock returns in the post-split period than before. Thus, coefficients b_3 and b_4 measure the incremental information content of earnings following the split as compared to before the split,

while b_1+b_3 (b_2+b_4) measure the sensitivity of earnings levels (changes) to stock returns in the post-split period.[4]

In addition to the earnings variables, several control variables are introduced in the models (see, for example, Dhaliwal et al. (1991) and Subramanyam and Wild (1996)). Specifically, given that potential shifts in the ERCs may reflect a change in underlying firm characteristics that are spuriously related to the reverse split, the models control for the following determinants of the ERCs: first, firm size which is proxied here by the log of assets (results from using a log of sales size proxy are similar). Second, firm risk is proxied by financial leverage (total liabilities/total assets). Third, I control for the sign of earnings, introduced as a binary variable for gains/ losses. Finally, a firm's growth opportunities are proxied by the ratio of the market value of the firm (equity capitalisation plus

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[4] An interesting extension of this test, not examined here, would be to study the information content of non-recurring earnings items as well, such as extraordinary items, discontinued operations, and prior period adjustments, that may mislead investors in valuing earnings in the pre-split period.

the book value of total liabilities) divided by the book value of total assets.

Given the erratic behaviour of the earnings and returns variables, it was deemed appropriate to employ rank regressions; i.e., to rank all variables and regress their ranked, rather than their raw values. This transformation was deemed necessary because most firms in this sample are extremely small, and their earnings and returns distributions are highly leptokyrtic (e.g., there' are numerous firms with extreme high and low earnings and stock returns that, based on their high frequency, are not outlying). Results from regressions using raw variable values after the deletion of certain outliers produces similar results. Nevertheless, the definition of outliers is important in the interpretation of results using raw variable values. Although the magnitude of the coefficients in rank regressions is difficult to interpret, tests using the ranked values of variables are deemed to be more reliable in illuminating the direction and statistical significance of the examined relationships.

Results from the rank order regressions are presented in Table 5. Based on F-statistics, each of the models presented in Table 5 is statistically significant at $p<0.01$. Focusing first on the full sample of reverse-splitting firms over the entire seven year period, an initial regression of the level of and changes in earnings on stock returns shows that, as expected, both variables are positive and significant, suggesting earnings provide useful information to investors in assessing the value of these firms. Next, interacting earnings levels and changes with time reveals this association is significantly stronger in the post-split period than before. Specifically, the coefficients for both the time/earnings levels interaction and the time/earnings changes interaction are positive and significant with respective t-values of 2.93 and 1.77, consistent with the reverse split revealing information about the permanence of earnings levels and earnings changes to market participants as predicted by the study's second hypothesis.

Further, the second equation in Table 5 is estimated more finely for firms with reported losses (NI<0) and gains (NI>0) separately since hypothesis 2a predicts that the post-split information content of losses is expected to be relatively higher. This sample partition into negative and positive earnings sub-samples is particularly informative: specifically, among firms reporting losses, the level of the loss (but not its change) is valued by market participants. Moreover, there is a significant increase in the informativeness of reported losses in the post-split period. By contrast, isolation of firms reporting positive earnings (gains) reveals that earnings changes are valued by market participants, while there is a statistically significant shift in the post-split information content of

earnings changes as indicated by the positive and significant interactive term coefficient (t-value = 2.04).

Although seemingly consistent with expectations, these results are somewhat inconsistent across sub-samples in that the second hypothesis is supported for earnings levels in the case of losses, but for earnings changes in the case of gains. One likely explanation for the importance of loss levels rather than loss changes may be drawn from Hayn (1995): reverse-splitting firms have the option to liquidate if losses persist. Thus, even if losses are reduced but remain to be losses nonetheless, the threat of liquidation overrides the benefit from the marginal improvement in earnings (reduction in losses). Thus, the continuous reporting of losses by reverse-splitting firms conveys to market participants an increased risk of failure. Investors become much more sensitive to this risk after assimilating the additional information provided by the reverse split. A second, related explanation for this result is based on the notion that equity may be viewed as a call option for the firm's residual claimants. In the case of persistent losses, equity is similar to an option out of the money; therefore, the value of equity is not very sensitive to changes in losses (the value of the underlying asset). The price of equity (value of the option) is more sensitive to the change in earnings when the option is in the money (i.e., the firm is profitable). In sum, the evidence in Table 5 suggests that both earnings levels and earnings changes become more informative after the split. Interestingly, the market capitalisation of losses and the information content of earnings changes become higher after the reverse split.

Note that the higher magnitude of the earnings coefficient in the loss model compared to the earnings model may be explained by the characteristics of the reverse splitting firms which are not representative of the general population of public firms. Reverse splits are associated with extremely small firms with poor performance and a very high earnings capitalisation factor (60% of all sample years exhibit negative earnings in this sample, about four times higher than in Hayn (1995)). For these firms earnings levels may not be as important because investors look forward to their future potential. By contrast, because of the higher risk of these firms, losses highlight the risk of failure and are therefore more value-relevant. This notwithstanding, the results in Table 5 do not provide definitive evidence as to the relative information content of earnings and losses in general given a different variance in the earnings variables in the two models and, more fundamentally, the possibility of an omitted variables bias in the separation of firms into 'loss' and 'gains' sub-samples.

It should also be noted that, although the empir-

Table 6

The Rank association between stock returns and earnings for 213 reverse-splitting firms between the years 1985–1993

Earnings (NI) is net income deflated by beginning-of-the-year book value of equity. The change in earnings is net income of the current minus net income of the prior year, all divided by beginning-of-the-year book value of equity. The dependent variable RET is stock return over the fiscal year measured as the share price at fiscal year end minus the share price at the start of the year plus dividends per share, all divided by the share price at the beginning of the year. A LOSS dummy is set to one if NI is negative and zero otherwise. The market-to-book ratio (MB) is computed at the start of each year as equity capitalisation (share price at fiscal year end times the number of outstanding shares of common stock) plus the book value of total liabilities, all divided by total assets. A SIZE variable equals the log of total assets. Financial leverage (LEV) is total liabilities divided by total assets. SIZE1, MB1, and LEV1 are dummy variables that are set to one if the respective size, market-to-book, and leverage proxies exceed their respective variable medians and zero otherwise. The two models on the right hand columns are estimated employing sub-samples of negative (NI<0) and positive (NI>0) earnings levels. The dependent variable and the independent variables are all converted to ranks. t statistics are in parentheses.

$$RET = \beta_0 + \beta_1 NI + \beta_2 \Delta NI + \beta_3 NI*POSTSPLIT + \beta_4 \Delta NI*POSTSPLIT + \beta_5 LOSS*NI + \beta_6 SIZE + \beta_7 SIZE*NI + \beta_8 MB + \beta_9 MB*NI + \beta_{10} LEV + \beta_{11} LEV*NI$$

	All firms	*All firms*	*NI < 0*	*NI > 0*
β_0	519.59 (13.32)***	496.39 (12.67)***	247.53 (4.23)***	227.57 (9.13)***
β_1	0.175 (2.96)***	0.111 (1.75)*	0.193 (2.92)***	–0.038 (–0.77)
β_2	0.061 (2.02)**	0.006 (0.16)	–0.023 (–0.39)	0.010 (0.21)
β_3		0.116 (2.64)***	0.141 (2.73)***	0.039 (0.94)
β_4		0.078 (1.84)*	–0.008 (–0.13)	0.150 (2.90)***
β_5	–3.909 (–2.25)**	–3.840 (–2.22)**		
β_6	–0.167 (–5.32)***	–0.172 (–5.51)***	–0.212 (–3.95)***	–0.486 (–10.99)***
β_7	–0.009 (–0.21)	–0.018 (–0.40)	–0.421 (–6.57)***	0.464 (9.54)***
β_8	0.033 (1.01)	0.028 (0.87)	0.298 (3.86)***	0.047 (0.84)
β_9	0.096 (2.45)**	0.063 (1.61)	0.190 (2.40)**	0.044 (0.77)
β_{10}	–0.119 (–4.21)***	–0.114 (–4.07)***	–0.134 (–1.71)*	–0.205 (–3.13)***
β_{11}	–0.058 (–1.34)	–0.050 (–1.16)	–0.027 (–0.31)	0.086 (0.77)
Adjusted R2	11.9%	13.1%	13.8%	26.9%
Sample size	1,062	1,062	499	563
F-value	16.89***	15.52***	8.95***	21.70***

*,**,***, significant at the 0.10, 0.05, and 0.01 level respectively.

ical evidence suggests a higher earnings coefficient after the split, one cannot be certain as to whether investors under-react before the split or over-react afterwards. That is, it is not clear whether the earnings coefficient is too low before the split or too high after the split. One possibility for testing this notion is to examine whether one may earn abnormal returns by taking a short position in the stock and holding it for some time after the split. This notion was not empirically explored in this paper.[5]

To control for the possibility that observed post-split shifts in the usefulness of earnings are spuriously related to firm size, growth opportunities, financial leverage, and the sign of earnings, the four models in Table 5 are re-estimated after introducing control variables for these effects as described in Section 3.[6] Moreover, both the four lower order variables and the corresponding 'earnings times control' interactive variables are included in the model each time. The results are presented in Table 6. First, all models in Table 6 are statistically significant at $p<0.01$ with the adjusted r-squared ranging from 11.9% to 26.9%. Again, both earnings levels and earnings changes remain positively related to stock returns. When the interactive terms are introduced, both interactive term coefficients are significant as in the corresponding model in Table 5 while the lower order variables are not, suggesting the observed positive earnings/ returns relation primarily springs from the post-split years. Finally, similar to results from Table 5, when the sample is partitioned into losses/gains, the results reveal an upward shift in the information content of negative earnings for firms reporting losses, and in the information content of earnings changes for firms reporting gains.

Thus, the addition of the control variables does not alter the results meaningfully. Among the control variables, the information content of losses is lower overall than the information content of gains as suggested by Hayn (1995). Further, the earnings of larger firms seems to be more informative. In this sample, the market seems to discount loss information for high growth firms and earnings information for low growth firms. Finally, financial leverage does not mitigate the earnings-returns relation significantly. Taken as a whole, the results in Table 6 provide general support for the second

hypothesis, and for the notion that reverse splits enhance the earnings-returns relationship by illuminating the splitting firm's financial status.

5. Conclusions

This study documents that reverse-splitting firms report significantly lower earnings in the pre-split years than a sample of matched control firms. The market does not appear to assimilate fully the value-relevance of earnings information over that period, potentially underestimating the permanent component of pre-split gains/losses. Following the reverse split, however, stock prices are significantly more sensitive to earnings, consistent with reverse splits revealing information on earnings persistence to investors.

These findings are largely consistent with findings documented by Asquith et al. (1989). That is, both regular splits and reverse splits reveal to market participants a higher-than-perceived level of pre-split earnings permanence. A noteworthy difference between the two events is that, while regular splits may be ends in themselves as vehicles to correct stock undervaluation, reverse splits do not aim at signalling firm value but, potentially, at moving stock prices to a more attractive trading range. The 'information' quality of reverse splits is likely inadvertent, and only a by-product of their original purpose. This point may explain why firms voluntarily send a negative signal about firm value to the market through a reverse split.

The results on the lower information content of losses compared to gains are also consistent with Hayn (1995). In a nutshell, losses are not expected to continue in perpetuity because shareholders have the option to liquidate; this is why, as found in this study, losses have a lower information content than positive earnings. Notwithstanding this evidence, an interesting outcome of the tests is that a reverse split illuminates the persistence of pre-split losses to market participants, and therefore enhances the information content of losses.

More broadly, reverse stock splits appear to function as an additional mechanism that may complement other corporate disclosure policies in conveying firm value to investors. Like other voluntarily employed disclosure choices (for example, stock splits and dividends, share repurchases, dividend policy changes, and expanded accounting disclosures) reverse splits aid investors in assessing the true value contained in earnings information. It therefore seems appropriate that earnings quality should not be studied in isolation; the reverse split experience suggests the market assesses earnings quality in the backdrop of each firm's wider set of information disclosure policies.

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[5] Thanks belong to an anonymous referee for drawing this possibility to my attention.

[6] While a vast body of literature has identified numerous ERC determinants, my choice of determinants relies on their wide acceptance and employment by prior studies, and is intended to capture the substance of the variation in ERC while preserving a parsimonious model.

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Mathews, Gynther and Chambers: three pioneering Australian theorists

Geoffrey Whittington and Stephen A. Zeff*

Abstract—This paper reviews the professional careers and contributions of three distinguished Australian academics, Russell Mathews, Reg Gynther and Ray Chambers, each of whom died recently. Particular attention is paid to their contributions to the debate on price change accounting, including the exchanges that took place between them on this subject. Price change accounting was a central issue in academic and professional debates of the 1960s and 1970s, when the trio were at the peak of their activity as academics. The paper also records the wide range of their contributions to accounting research, education, standard setting and public policy.

1. Introduction

Three pioneering Australian accounting theorists recently passed from the scene: Russell Mathews, Reg Gynther and Ray Chambers. Another Australian pioneer, Lou Goldberg, a noted historian and theorist, died in 1997.[1] All four made substantial marks not only in Australia but also overseas. The purpose of this article is to recognise the respective contributions to the accounting discipline of Mathews, Gynther and Chambers, who died between September 1999 and March 2000.

Mathews, Gynther and Chambers, together with Goldberg, while distinctive figures in the postwar evolution of accounting academe in Australia, nonetheless had a number of attributes and achievements in common: they were intellectual leaders *par excellence*, they were the first four presidents of the organisation of Australian accounting educators, and they were the first full-time accounting academics at their respective universities. Ray Ball has written that 'these people established the honors and doctoral programs that captured the interest of and trained my generation. Without them I wouldn't be here'.[2]

In addition to their important work in developing accounting as an academic discipline in universities, the trio also made important contributions to

the development of accounting thought. In particular, they were all involved in the fierce international debate on price change accounting which raged in the 1960s and 1970s, and we shall use their contributions to this debate to illustrate their different styles of thought and the interactions between them.

The paper proceeds as follows. First, we describe the historical context within which our trio worked. Second, we provide biographical sketches of each, particularly emphasising their contribution to accounting thought and education. Third, we discuss the distinctive contributions of each to the price change accounting debate. Fourth, we examine two controversial exchanges between Chambers and Mathews and between Chambers and Gynther. Finally, we consider the legacy of the trio from the perspective of the present day.

2. Historical context

The era of predominantly full-time accounting academics both in Great Britain and Australia dawned after World War II, lagging the Americans by some four decades. The first full-time accounting chairs in Britain were filled in 1947 (by William T. Baxter at the London School of Economics (LSE), and Donald Cousins at the University of Birmingham[3]), but in Australia it was not until 1955 that the first full-time accounting professor, E. Bryan Smyth, at the University of New South Wales, commenced his tenure.[4] Four years later, Louis Goldberg became the second full-time ac-

* The authors appreciate the major assistance, including comments on an early draft of parts 1 and 2, supplied by Ken Wright, Frank Finn, Allan Barton and Geoff Burrows, as well as the useful comments by others who read early drafts: John McB. Grant, Scott Henderson, Philip Brown, Ray Ball, Kevin Stevenson, Richard Morris, Graeme Dean, George Foster, Michael Gaffikin, Jayne Godfrey, Lee Parker, Allen Craswell, Stewart Leech, Bob Officer, Jean Kerr, Merle Gynther and Geoff Harcourt. They also appreciate the information furnished by Russell Craig, Malcolm Miller, Jill Bright and Graham Peirson, and interviews with Allan Barton and Geoff Harcourt. The comments from an anonymous referee were useful. The authors are solely responsible for what remains.

[1] For personal portraits of Goldberg, including a list of his publications, see Kerr and Clift (1989) and Parker (1994).

[2] Letter from Ball to Zeff, dated 20 July 2000.

[3] For further discussion, see Zeff (1997: 9).

[4] In this paper, the year in which a chair's occupant began his tenure, not the year in which the appointment was made, is used throughout.

counting professor in Australia, filling the G. L. Wood chair at the University of Melbourne.[5] Goldberg thus succeeded the distinguished practitioner, scholar and public servant, Sir Alexander Fitzgerald, who had occupied the chair on a part-time basis since its inception in 1954 and had served as a part-time lecturer in the university continuously since 1925. In 1958, Mathews had become professor of commerce at the University of Adelaide. In the 1960s, Australian universities continued to stimulate academic work in accounting, installing eight foundation professorships in, or related to, accounting, as follows:

1960 Ray Chambers, University of Sydney
1960 John McB. Grant, University of Tasmania, professor of applied economics (with special reference to accounting)
1965 James W. Bennett, Monash University
1965 Mathews, Australian National University, professor of accounting and public finance; F. Kenneth Wright succeeded to Mathews' Adelaide chair
1966 Martin O. Jager, Newcastle University
1967 Reg Gynther, University of Queensland
1967 Allan D. Barton, Macquarie University
1968 Athol S. Carrington, University of New South Wales

In Britain and Australia, the accounting theory literature began to build in the 1930s. In Britain, Ronald S. Edwards (1938) and R. H. Coase (1938) wrote important articles, and they were succeeded in the literature by William T. Baxter, Harold Edey and David Solomons following the war (see Whittington, 1994).[6] These early theorists were all at LSE, and LSE graduates of the 1950s and 1960s, as well as a growing cadre of researchers from other institutions, continued to make important contributions (see Whittington, 1981).

Australian accounting theorists also launched their efforts in the 1930s, when Fitzgerald began writing a stream of articles that culminated in the publication of two books in 1952: *Current Accounting Trends* and, with L. A. Schumer, *Classification in Accounting.*[7] Through his many articles, his public lectures, and his leadership in the professional accountancy bodies, Fitzgerald stimulated interest in academic and professional accounting developments that were occurring in the US and the UK, including especially the growing literature on accounting theory. As Sir Douglas Copland has written, 'no other person has contributed so much and in so many capacities to the academic development of accounting [in Australia] as Sir Alexander Fitzgerald' (1965: Introduction). Although the chair that Fitzgerald occupied for five years in the 1950s was part-time, he was believed to have spent more time at the university than many full-time academics.[8]

In 1939, Louis Goldberg began his many contributions with the publication of his landmark thesis, *A Philosophy of Accounting*. By the 1950s, Australian accounting theorists began to develop an even more vibrant literature. At Sydney and Adelaide, Chambers and Mathews (with Grant), respectively, were beginning to mark out significant theoretical turf. And in the 1960s, Gynther, at Queensland, began to stake his own claim. Kenneth Wright and others joined in the quest.

It is interesting that a country as small as Australia has produced so many important contributors to the international literature on accounting theory. One view on this phenomenon is that of Ken Wright: 'I believe that an important source of that strength was the fact that all our university departments of accounting were located in faculties of economics'.[9]

Publication outlets for theory papers were comparatively few until the 1960s: the professional magazines *The Accountant* and the *Incorporated Accountants' Journal* (which became *Accountancy* in 1938) in Britain, *The Australian Accountant*, and *The Journal of Accountancy* in the US, plus the two academic journals *The Accounting Review* and *Accounting Research* (1948–1958). In the 1960s, the *Journal of Accounting Research*, *The International Journal of Accounting Education and Research*, and Chambers' ambitious entrant, *Abacus*, quickly became established vehicles.

3. Biographies
3.1. Russell Lloyd Mathews (1921–2000)
Russell Mathews was born on 5 January 1921 in Geelong and attended Haileybury College in Melbourne, where he was dux of the school.[10] He went straight from school to work and studied accountancy in night school in order to obtain a qualification. He saw Army service in New Guinea and Bougainville during the war, which he described in his official history of his battalion (Mathews, 1961). He rose to the rank of Captain and was cited for bravery. But he sustained a serious leg injury,

[5] As will be noted below, accounting courses were offered by part-time instructors in Australia as early as 1902, beginning at Adelaide (Edgeloe, 1989).
[6] In the 1930s and 1940s, Baxter also wrote important articles and a book on accounting and business history.
[7] For a list of Fitzgerald's publications, see Chambers et al. (1965: 226–240). For a profile of Fitzgerald, see Burrows (1989).
[8] This belief was confirmed by Ken Wright and Jean Kerr in letters to Zeff dated 11 August and 1 September 2000, respectively.
[9] Letter from Wright to Zeff, dated 23 April 2000. Harcourt (1982: 1–2) acknowledges the benefit that an economist derives from this relationship.
[10] 'Dux' means that he was the school's outstanding scholar, i.e., he topped the examination averages or won the most subject prizes.

and he limped for the rest of his life (Karmel and Barton, 2000). After the war, he enrolled in the University of Melbourne under the Commonwealth Reconstruction Training Scheme, which enabled ex-servicemen and women to study full-time. In 1950, he graduated with a four-year honours Bachelor of Commerce (B.Com.) degree, majoring in economics but with a substantial accounting content.[11] He qualified as a member of the Commonwealth Institute of Accountants.[12]

Following graduation, he moved to Canberra to become a personal assistant to Sir Douglas Copland, the first Vice Chancellor of the recently established Australian National University. 'Russell's major task,' writes Allan Barton, 'was to recruit some of Australia's most prominent academics to return to Australia for the new research university' (Barton, 2000a).

In 1953, Adelaide's economics professor, Peter H. Karmel, who had taught Mathews at Melbourne, brought him to Adelaide as reader in commercial studies, and Mathews was given responsibility for the courses in public administration and public finance, as well as in accounting and commercial law. He thus became Adelaide's first full-time teacher of accounting, even though accounting instruction at the university had begun in 1902 (Goldberg, 1981: 6; Edgeloe, 1989; Mathews, 1964b). The distinctive features that he introduced into his first-year accounting syllabus were replacement cost accounting and consolidations. Wright recollects: 'His reasoning was that the compulsory first-year subject, which he named "Elements of Accounting", should introduce future economists to those two techniques. Consolidations were considered important for economists because consolidation accounting is the basis of the National Accounts'.[13] The textbook that Mathews wrote in 1962 carried the title, *Accounting for Economists* (to be discussed below).

Mathews' preferred emphasis on the education of economists was made easier by the fact that the 'the South Australian Institute of Technology, with its own School of Accountancy, was situated immediately adjacent to the University. It would have been wasteful for the two institutions to run very similar courses. Since the SAIT was committed to providing courses leading to professional accountancy qualifications, it was decided that the University's programme should emphasise the needs of students who did not necessarily intend to take up accounting as a profession' ('The University of Adelaide', 1973: 424). The second unit in the accounting stream of the Bachelor of Economics (B.Ec.) course treated the managerial uses of accounting, and the third year was intended mainly for future accountants, but the work in accounting theory was 'solidly grounded in economic theory' (p. 424).[14]

In 1953, Mathews described the objectives and structure of the new courses in accounting as follows:

'In designing the new courses in accountancy we have been influenced by two broad considerations: first, the need to go back to first principles and to provide where possible a theoretical basis for the practical work in accounting methods that must necessarily occupy so much of our time; and second, the need to relate our courses in accounting to the work done in the social sciences of economics, law, statistics, political science, etc. The emphasis throughout will be on theory and principles rather than on techniques, and the approach will be logical rather than mechanical.' (Mathews, 1964c: 3)

In 1962, the year in which he published *Accounting for Economists*, Mathews elaborated on his strong views regarding university education in accounting:

'...I believe university work in accounting should be analytical rather than merely descriptive. If a subject is to establish itself as a university discipline it must be intellectually challenging, that is to say it must operate as a mental discipline, and it must have a place on the advancing frontier of knowledge. I believe that accounting can meet these tests, but only if it is developed as an analytical tool with emphasis on theory rather than on descriptions of current practice, with emphasis on why rather than how.' (Mathews, 1964a: 24)

He said he started from the position that 'accounting, although one of the basic social sciences, is the hand-maiden of economics' (p. 26).

Mathews was, from the very beginning of his academic career, deeply interested in macro-accounting issues, and one of his early themes was social accounting. His first published article, written while he was an undergraduate student, was 'Government Accounts for Social Accounting' (1948). In 1951, his 12th Commonwealth Institute of Accountants' research lecture was titled 'New Horizons in Accounting: The Application of Accounting Techniques to Problems of Social

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[11] Geoff Burrows has written that Russell's 'overall record, with only one P and the rest H1s, has rarely been surpassed'. E-mail message to Zeff, dated 26 July 2000. Allan Barton, who was an honours graduate the University of Melbourne in 1954, agrees. Letter from Barton to Zeff, dated 10 August 2000.

[12] In 1953, the Institute combined with another body to form the Australian Society of Accountants, which is known today as CPA Australia.

[13] Letter from Wright to Zeff, dated 12 May 2000.

[14] A description of the course content of the B.Ec. degree is given in an article, probably written by Ken Wright, in *The Australian Accountant* ('The University of Adelaide', 1973).

Accounting' (1952). Five years later, he gave the Australian Society of Accountants' research lecture at the University of Melbourne on 'Government Accounts and Social Accounting' (1957).

In 1958, Mathews was promoted to become Adelaide's first professor of commerce. He was instrumental in establishing a Master of Business Management degree, which was to comprise two years of full-time study followed by a thesis. After overcoming initial opposition from the University's education committee, in 1960 Mathews succeeded in gaining approval for the degree, which was the first of its kind in Australia (Mathews, 1964c: 10).[15] It was launched in 1962, and Allan D. Barton, who had joined the Adelaide staff in 1959 as a lecturer in economics and had received a PhD in economics from the University of Cambridge in 1961,[16] was appointed to the new position of senior lecturer of business management. Ken Wright, who came to Adelaide in 1962 as senior lecturer in commerce and also was to give instruction in the MBM programme, recalls:

'Russell had his heart set on a full-fledged graduate school of business at Adelaide. But enrolments in the initial years continued to be very small, and the [University's] Development Committee apparently took the view that the number of students did not justify additional appointments. Russell was quite disenchanted'.[17]

Also in 1958, Mathews played an active role in the founding of what was to become, two years later, the Australian Association of University Teachers of Accounting (AAUTA)[18] (Goldberg, 1987: 13–40). He served as the body's president in 1963.

Mathews, together with economist Peter Karmel, stimulated the interest of a number of young academics in the commerce and economics departments, most of whom went on to occupy chairs and have distinguished academic careers. Those who made significant contributions to accounting included John McB. Grant, Geoff Harcourt, Wright, Barton, James W. Bennett, Robert H. Parker, Scott Henderson and Graham Peirson.[19] Mathews' first book, *Inflation and Company Finance*, published in 1958, was co-authored with Grant. It presented a statistical analysis of the accounting effects of inflation on Australian company profits and finances during the years of postwar inflation. The book was said to be 'the first study in Australia of the impact of inflation on corporate profits and finance' (Karmel and Barton, 2000). Much of the book drew on journal articles that Mathews and Grant had recently published. Grant writes that Mathews was 'the initiator and primarily responsible for Chapter 2'.[20] Grant was responsible for most of the statistical analysis (see Section 4.1 for further discussion

of this work).

Both in *Inflation and Company Finance* and *Accounting for Economists*, Mathews advocated the use of valuation adjustments for stocks and fixed capital assets. He did not favour the application of a general price-level index to historical cost data (see Mathews, 1965a). Parker has written that, in Mathews' *Accounting for Economists*, 'it was typical of RM not just to get the theory right but also to produce a workable solution (two relatively simple adjustments in the P&L account) rather than insisting on total reform of HCA [historical cost accounting]'. Parker added that Mathews' book with Grant 'also greatly influenced me'.[21] It also influenced many others, including economists, such as Geoff Harcourt, who writes that his Cambridge PhD dissertation 'was in effect Mathews and Grant for the UK (with a bit of Joan Robinson's *The Accumulation of Capital* [1956] thrown in)'.[22]

Mathews contributed to the writing of the chapter that dealt with accountancy education in the Commonwealth's Martin Report on the future of tertiary education, issued in 1964, and in the following year he criticised the Vatter Report (1964), sponsored by the professional accountancy bodies, because it proposed a continuing intrusion by the bodies into the educational policies and practices of the universities. Mathews favoured a liberalised undergraduate program, in which students would study, in conjunction with accounting, such related disciplines as economics, statistics, mathematics, law and the behavioural fields, with a requirement

[15] New South Wales inaugurated Australia's first M.B.A. course in 1962.

[16] Barton, who had graduated from the University of Melbourne with a first class honours degree in commerce, with majors in accounting and economics, thus became the first Australian accounting academic to earn a doctorate. In fact, two New Zealanders, G. Bernard Battersby and Trevor R. Johnston, were the first accounting academics in the antipodes to obtain doctorates: Battersby, at the University of Canterbury, obtained a PhD in business finance from the University of London in 1951, and Johnston, at the University of Auckland, received a PhD in economics from Cambridge University in 1954.

[17] Letter from Wright to Zeff, dated 12 May 2000.

[18] In 1964, Australian became Australasian, and in 1972 the name was changed to the Accounting Association of Australia and New Zealand so as to broaden the membership to include those at non-university colleges (Goldberg, 1987: 50–51, 62–63). Subsequent references to the Association will use Australasian, which embraces both Australia and New Zealand.

[19] Parker is English and the others are Australian. Gibson has remarked that a number of those who fell under Mathews' spell at Adelaide 'subsequently have joined in the advocacy of current cost accounting' (1984: 241).

[20] Letters from Grant to Zeff, dated 23 May 2000 and 20 July 2000.

[21] E-mail message from Parker to Zeff, dated 1 June 2000.

[22] Note from Harcourt to Whittington, dated November 2000.

that they study in depth some of these latter subjects. His view was that 'the primary role of the universities is to develop accounting as an academic subject; if they have a role at all to play in the field of professional education, it is at the postgraduate and not the undergraduate level' (1965b: 3B-15). He opposed a possible consequence of the Vatter Report, namely, that accounting research should be focussed primarily on the needs of the profession and not as an academic subject in its own right (p. 3B-10).

In 1964, the Australian National University announced a new department of accounting and public finance, which 'had been established to attract Russell back to the ANU', as he 'always believed in the merits of combining the accounting and economics disciplines as much as possible' (Karmel and Barton, 2000). He applied for and received the new chair, and he moved to the ANU at the end of the year.

At the ANU, Mathews continued his interest in accounting, although, with the founding in 1972 of the Centre for Research in Federal Financial Relations, of which he became director, the larger questions of public finance came to occupy almost all of his time and interest. Between 1965 and 1972, he published his last four articles on accounting theory,[23] including one on methodology, with John W. Buckley and Paul Kircher (1968), which he had proposed doing during his year as visiting professor at the University of California, Los Angeles, in 1966.[24] Also, between 1965 and 1972, Mathews served on the Accounting and Auditing Research Committee of the Accountancy Research Foundation (Burrows, 1996: 196), a body just created by the organised accountancy profession that was to sponsor pure and applied research in accounting and auditing.

In comparison with Chambers, whose long professional career of more than 40 years was as an accounting academic, Mathews and, as will be seen, Gynther were accounting academics for periods of less than 20 years each.

In 1971, Mathews wrote *The Accounting Framework*, a textbook styled as a revised edition of *Accounting for Economists*. In his preface, he issued a stern pronouncement on the state of accounting when he entered academe:

'During the first half of the 20th century...accounting became increasingly remote from reality, as complex allocation procedures, implicit valuation assumptions and the possibility of arbitrary choices among alternative valuation or procedural rules combined to make accounting information irrelevant for many of the uses it purported to serve. By the end of the half-century, it is not too much of an exaggeration to say that accounting had become a great illusion enacted before a credulous business community,

the members of which thought they were receiving information related to their decision-making responsibilities but who were instead often being fed irrelevant or misleading data based on stylised accounting conventions.' (p. xiii)

Strong stuff, indeed. He hastened to observe that, in the last 15 to 20 years, there had been 'a significant change in direction', with the emergence of accounting as an information system, the increasing use of quantitative analysis to test the usefulness of accounting information, and the growing importance of systematic theories of valuation in place of rules of thumb in income measurement (pp. xiii–xiv).

Barton has written: 'Along with his academic work, Russell was keenly sought after by governments of both persuasions for advice on all matters to do with taxation and fiscal federalism' (2000a).[25] In 1974–1975, in the middle of a decade of mounting inflation, Mathews chaired an Australian Government committee to study the effects of inflation on taxation. Among the recommended reforms in the Mathews Report (Report of Committee of Inquiry into Inflation and Taxation, 1975), as it came to be known, were a stock appreciation adjustment and a depreciation valuation adjustment, both on a replacement cost basis, which dovetailed with the argument that Mathews had been making for profit measurement since the 1950s. The report was said to have 'introduced the current cost revolution in Australia' (Tweedie and Whittington, 1984: 267), much as the report of the Sandilands Committee (1975) did in the UK. (See Section 4.1 for further discussion of the Mathews Report.)

During Mathews' service on the interim board of management of the newly created Australian Graduate School of Management, it was he who persuaded Philip Brown, then at the University of Western Australia, to become the School's foundation director in 1975.[26] In this respect, Mathews gave a boost in Australia to the market-based research in accounting and finance in which Brown was a leader.

Mathews served as a consultant to government bodies as well as a member or chairman of a number of other Government commissions and committees of enquiry, including the Review of the Accounting Discipline in Higher Education, which

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[23] We exclude from this count a reply (1967) and a rejoinder (1968) relating to his review article in the *Journal of Accounting Research* (1965a). These are discussed in Section 4.1.

[24] Telephone interview with John W. Buckley, 16 June 2000.

[25] Mathews' work in these areas is surveyed in Grewal and Barton (2000), which includes a useful list of the major publications.

[26] E-mail message from Brown to Zeff, dated 25 August 2000.

he chaired. The review panel's report, rendered in 1990, made sweeping recommendations with respect to funding, degree structure, teaching and research. The Mathews Report, as it also came to be known, was a factor leading to consideration of the funding of salary supplementation out of either recurrent funds or funds from full-fee paying students. Its proposal for a 'broad-based' three-year curriculum, followed by a fourth year leading to a professional accounting qualification, did not, however, come to pass. In all, the Mathews Report did not have a considerable impact at the time.

During his long service on the Commonwealth Grants Commission, from 1972 to 1990, he was the principal author of many of its reports (Karmel and Barton, 2000).

Karmel and Barton have written:

'Russell always combined accounting, economics and finance. He was a firm believer in normative approaches to economic enquiry that would assist in policy analysis. He strongly supported the need for social justice and full employment, and in this regard, he was an advocate of Keynesian policies for macro-economic management and Galbraithian policies for public sector infrastructure.' (2000)

Russell Mathews retired and was made professor *emeritus* in 1986. His public service was recognised by a CBE in 1978 and an AO (Order of Australia) in 1987. During his long career, he wrote or edited 43 books, produced 47 official reports, and wrote in excess of 250 articles, encompassing accounting theory and education, fiscal federalism, taxation theory and policy, and public expenditure theory and policy (Barton, 2000a).

Allan Barton, his longtime colleague and friend, remembered Russell Mathews as 'a gentleman in every way. He was always polite, considerate, compassionate, friendly, reliable, etc. He was a great person to work with. He was never autocratic – he led by example, understanding and kindness, and was always approachable.'[27] Philip Brown, who served with Mathews on the 1990 review panel on Accounting Discipline in Higher Education, has written: 'Three things always struck me about Russell during the review: his eye for detail, his quick mind, and the speed with which he could write a report!'[28] Russell Mathews died on 1 March 2000.

3.2. Reginald Sydney Gynther (1921–1999)

Reg Gynther was born on 24 September 1921 in his parents' home in Nundah, a suburb of Brisbane. His parents were working class people, and he had to leave school after his junior year to get a job and enrol as a part-time evening student. During the war, he served in the Army and rose to the rank of Lieutenant. After the war, he worked as

a company secretary and accountant, and eventually as assistant manager for several companies, first in Sydney and then in Brisbane. He qualified as a member of the Australasian Institute of Cost Accountants,[29] the Institute of Chartered Accountants in Australia, and the Australasian Institute of Secretaries.

Gynther began as a part-time lecturer in accounting at the University of Queensland in 1952, and in 1959, at age 37, he accepted the first full-time appointment in accountancy, a senior lectureship in the department of economics. When the department of accountancy was established in 1961, he became its head.[30] The following year, he received a B.Com. degree from Queensland.[31] He was advised, however, that he could not be promoted to professor without a doctorate, and there was no one at Queensland of appropriate rank who would be competent to supervise a thesis in accounting. He was entitled to a year's study leave, and, by diligent enquiry, he discovered that the University of Washington, in Seattle, would accept him as a doctoral candidate with only a year's study in residence, but only if he already had a master's degree. He then wrote to Russell Mathews to ask if Adelaide would allow him to enrol for its Master of Economics (M.Ec.) degree by submitting a thesis *in absentia*. Mathews persuaded the faculty dean to accept this arrangement, in view of the unusual circumstance in which Gynther found himself. Mathews also agreed to serve as Gynther's thesis supervisor. Gynther wrote a thesis on the choice of index in accounting for price-level changes, which was an outgrowth of an article he had published in 1962. The degree was awarded in 1964, and two years later Pergamon Press published Gynther's thesis under the title, *Accounting for Price-Level Changes: Theory and Procedures*. (For discussion of this book, see Section 4.2.) In the book, Gynther explained his advocacy of specific price indexes for financial reporting purposes as follows:

'...it so happens that most accountants in public practice favour the use of one general index because many of their duties relate to the protection of the interests of shareholders. On the other hand, accountants in commerce and industry

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[27] Letter from Barton to Zeff, dated 10 August 2000. Similar sentiments were expressed by Geoff Harcourt in an interview with Whittington, August 2000.

[28] E-mail message from Brown to Zeff, dated 27 June 2000.

[29] In 1966, the Institute became part of the Australian Society of Accountants, which is known today as CPA Australia.

[30] The department was renamed Commerce in 1973.

[31] He had begun his university studies on a part-time basis in 1941, earning his Associate in Accountancy of the University of Queensland (AAUQ) certificate in 1943. He resumed his part-time studies in 1958 and completed his work for the bachelor's degree in 1961.

usually favour the use of specific indexes. The author of this book has been affected by his environment (in industry) and he is a firm supporter of the use of specific indexes for the determination of profit, for balance-sheet valuations, and for day-to-day accounting and reporting purposes.' (1966: 45)

This perspective on accounting was shared by Russell Mathews, who approached the subject as an economist concerned with the health of the business sector.

Also in 1964, Gynther somehow found time to serve as president of the AAUTA.

With the master's degree in hand, Reg Gynther was promoted to a readership. He then obtained an Arthur Andersen & Co. fellowship and planned to spend 1965–1966 at the University of Washington, which used one of its Ford Foundation doctoral fellowships to help support his visit. His choice of topic for a doctoral thesis was a profile of the Australian accounting profession, patterned on a study by A. B. Carson of the public accounting profession in California (1958). In fact, during 1964–1965 Gynther had designed the survey instrument, had mailed the questionnaires and received the replies, and also had completed an extensive draft of his thesis, even before he arrived in Seattle; hence, the critical part of the research and writing had all but been completed before he began his year of doctoral study. Once in Seattle, he was shocked to discover the amount of coursework outside accounting that was required, as well as written and oral examinations in addition to a thesis. Undaunted, and with characteristic zeal and tenacity, Gynther completed all of the doctoral requirements just prior to leaving Seattle after 12 exceptionally full months, which included some part-time teaching.[32] The Doctor of Business Administration (DBA) degree was conferred in 1966,[33] and in the following year he published his thesis as a book entitled *Practising Accountants in Australia: An Analytical Study* (1967b). The book had a mixed reception. It was praised 'as a truly fine demonstration of the value of research by way of questionnaire when intelligently performed' in *The Accounting Review* (Dixon, 1968: 614). But Robert G. Walker, in *Abacus*, found the survey to be 'lacking in depth, and therefore disappointing' (1968: 94). In 1967, Gynther became Queensland's first professor of accounting.

Gynther installed a very successful honours programme in the department of accountancy, dating from the early 1960s. It was said to be 'the first in Australia to concentrate completely on honours level studies in accounting related subjects' (Yule, 2000: 21). Quite a number of his honours students entered academe and eventually were appointed to chairs.[34] While no one could be said to have been a Gynther disciple, 'most who did honours under

him are full of respect for all his pushing, cajoling, arguing, etc. during the honours program'.[35] Gynther insisted that each of the honours students adopt some position, e.g., current cost accounting, and defend it before the class. Richard D. Morris recalls: 'we were encouraged to argue about each issue in class. He had a great gift for instilling enthusiasm about accounting theory into his students, and I can still recall us debating among ourselves after class. There was a special camaraderie among honours students, at least in my year.'[36] One of his honours students, Geoff Meredith, completed a PhD under Gynther in 1969 and thus became the first Australian accounting academic to receive a doctorate from an Australian university.

Gynther recruited a strong staff, including Robert R. Officer and Ray Ball, both coming from the University of Chicago. Officer was appointed to the fledgling department of management, while Ball went to the department of accountancy. Yet Officer has written that he was 'always intellectually, socially and emotionally tied to the Department of Accounting.'[37] Gynther recognised the significance of the new wave of empirical accounting and finance research emanating from Chicago, and he had the foresight and courage to bring a young exponent of this research into his department, only the second in Australia to do so.[38] Ball, who joined the department as professor of accounting and finance in 1972, was, at age 27, the youngest accounting professor in Australia as well as the youngest full professor in any discipline at the University of Queensland (*Prospectus*

[32] E-mail messages from Gerhard G. Mueller to Zeff, dated 1 May and 11 September 2000, communication dated 30 June 2000 from Merle Gynther (Reg Gynther's sister), and telephone interview with Kermit O. Hanson, 22 July 2000. Arthur N. Lorig was the chairman of Gynther's doctoral committee, and Mueller was a member of the committee. Hanson was dean of the University of Washington business school at the time.

[33] In the 1970s, the University of Washington retitled all DBA's as PhD's.

[34] 'Of the Honours graduates with academic careers, most have obtained further postgraduate awards. Approximately half of their number have been awarded PhD's in USA and in Australia' (M. Gynther, 1990: 341).

[35] E-mail message from Frank Finn to Zeff, dated 8 May 2000. Finn obtained an honours degree from Queensland in 1969 and is currently head of the department of commerce. Among the others who did at least some honours work under Gynther and who then embarked on academic careers were Allen Craswell, Peter Dodd, Allan Kleidon, Richard Leftwich, Terry Marsh, Geoff Meredith, Richard Morris, Stephen Penman, Barry Spicer, David Watson, Ron Weber and Greg Whittred.

[36] Letter from Morris to Zeff, dated 15 May 2000.

[37] E-mail message to Zeff from Officer, dated 28 August 2000.

[38] In 1968, Philip Brown, fresh from Chicago, went to the University of Western Australia as reader in accounting. He became UWA's foundation professor of accounting in 1970.

2000/Department of Commerce, 2000: 19). Finn (1999) has written that 'Ray Ball's appointment totally changed the research emphasis and culture in the Department, and much of what the Department does today has its foundations in that appointment in 1972'. Ball left Queensland in 1976 to accept one of the foundation chairs at the new Australian Graduate School of Management, in Sydney.

Gynther also introduced the first dual degree in Australia linking commerce and law, which today 'is one of the most popular degrees for graduates and practitioners in both the legal and accounting professions in Australia' (Finn, 1999).

Most of Gynther's articles dealt with the theoretical and practical aspects of accounting for price changes, and he was a tireless advocate of current cost accounting. His three articles in *The Accounting Review* attracted considerable attention: 'Accounting Concepts and Behavioral Hypotheses' (1967a), 'Some "Conceptualizing" on Goodwill' (1969) and 'Capital Maintenance, Price Changes, and Profit Determination' (1970). These are discussed in Section 4.2.

Between 1961 and 1977, Gynther published 27 articles, many of which were reproduced in collections, 'leaving a legacy from his 18 years few academics match in a lifetime' (Gibson, 1984: 246). In 1977, at age 55, he decided to leave academe for a policy-level position in public accounting. He became a national partner of Coopers & Lybrand in Australia, with responsibilities in research and eventually also in professional education. During the inflation accounting debates in the late 1970s and early 1980s, he was the face of Coopers, speaking and writing extensively on the merits of current cost accounting. From 1977 to 1983, he was an energetic member of the Accounting Standards Committee, which was reorganised in 1978 as the Current Cost Accounting Standards Committee (CCASC). He was much involved with the preparation of the CCA Working Guide, and he did the initial work on the committee's exposure draft on monetary items.[39] (See Section 4.2 for further discussion of this work.)

Gynther also fathered the Coopers & Lybrand Accounting and Education Research Fund, which financed research by academics and provided honours and master's scholarships.[40] He retired from the firm in 1985.

In his capacity as head of the accountancy/commerce department, Reg Gynther has been described as 'a totally dedicated, straight down the line leader, with a limitless capacity for hard work...[and regarded by a colleague] as "the time and motion man" because he hated to waste a minute' (Yule, 2000: 27). Gynther was keenly competitive in any endeavour he undertook, whether work or sport.[41] Yule added that Gynther

'had a highly centralist style, seeing consultation

as a waste of time and consensus as automatic as everyone would agree with him. Having a total commitment to the department and the advancement of academic accounting, Reg Gynther was prepared to take on anyone who threatened the department or queried the position of accounting as an academic discipline. Although he had very conservative attitudes, he was tolerant of personal eccentricities, provided that people pulled their weight in teaching and research.' (p. 27)

Kevin Stevenson, a former director of the Australian Accounting Research Foundation and a former technical partner in Coopers & Lybrand, has written that, during Gynther's long service on the CCASC, 'he was a mentor to many, including me, much in the mode [that he was in his department at the University of Queensland]. Reg had the ability to move between academe and practice, and the drive to do whatever needed to be done. His approach to his PhD was not a one-off effort – it was the way he worked....His energy, understanding and capacity for work were exhausting for me'.[42]

Following Gynther's departure from the University of Queensland in 1977, its Senate conferred on him the title of professor *emeritus*. He died on 27 November 1999.

3.3. Raymond John Chambers (1917–1999)

Ray Chambers was born on 16 November 1917 in Newcastle, New South Wales, the son of a Yorkshire coal miner. He was educated at Newcastle Boys' High School, and a university scholarship enabled him to enrol as a part-time student in economics at the University of Sydney. He graduated with a B.Ec. degree in 1939 (Wolnizer, 2000: 1). In 1934, he had begun studying accounting by correspondence in order to obtain a qualification (Chambers, 1991: 101–102; Chambers, 2000: 318–320).

Following three years as a stock clerk in Shell and two years as a materials control supervisor and statistical officer in a large light engineering firm, Chambers spent the further war years of 1943–1945 on the regulatory staff of the Australian Prices Commission (Chambers and Dean, 1990: 287; Chambers, 1991: 102). There, as Chambers has written:

'I was engaged in the analysis of the financial statements and cost calculations of firms. Prices

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[39] E-mail message from Kevin Stevenson to Zeff, dated 24 July 2000.

[40] E-mail message from Stevenson to Zeff, dated 19 April 2000.

[41] Zeff recalls that, in a visit to Gynther's home in 1972, he defeated Gynther in several games of table tennis, which the latter never forgot.

[42] E-mail from Stevenson to Zeff, dated 23 July 2000.

were controlled by reference both to costs and profits. Ideally the figures supplied by firms should have been derived by the same rules, so that comparisons of firms and industries could be readily made. I had previously worked in two large manufacturing companies and had some idea of the rather crude ways in which cost calculations and asset values were made. Now, confronted by the accounts of many firms in many industries, all using their own combinations of accounting rules, the impression of disorder was intensified.' (1974a: vi)

In a later retrospection, he added: 'Brought up on basic economics – the ideas of economising at least, profit maximising at best, and the adaptive behaviour which the theory of market economics entailed – there seemed to be no place for the conventional accounting stuff' (1991: 103).

By 1943, he had qualified as a member of the Commonwealth Institute of Accountants,[43] the Australasian Institute of Cost Accountants, and the Australasian Institute of Secretaries.

Chambers began to lecture part-time in auditing in Sydney Technical College, and then in 1945 he became a full-time lecturer in the College's new course in financial management. He taught in all facets of the College's programme, including accounting. He continued to be vexed by 'the coexistence of different accounting rules yielding figures of greatly varying quality. How discriminating managers, investors and creditors could use such figures was at least puzzling' (1974a: vi). When he discovered the need for a textbook to link accounting with financial administration, he wrote *Financial Management* (1947). It was, he later wrote, 'the product of my first two years as a full time teacher' (1991: 105). Although its author had not yet reached his 30th birthday, the book was a mature and comprehensive work, which demonstrated a commendable awareness of the leading American and British and Australian literatures. Goldberg called it 'the first book of its kind in Australia' (1981: 32).[44]

During the early 1950s, Chambers gave a series of research lectures at Australian universities, and these, together with a triptych of lectures for a refresher course sponsored by the Commonwealth Institute of Accountants, were published in *The Australian Accountant*, which, under the enlightened editorship of Alexander Fitzgerald, became a favoured outlet for academics. The research lectures represented his first forays into theory development, in which, among other things, he proposed a future orientation for the financial statements (Chambers, 1952a). 'That experience,' he later wrote in reference to his extensive study of the accounting literature in the course of preparing the research lectures, 'revealed many specific points at which conventional doctrine and practice

were financially wayward and logically fallacious....To point out these flaws, and to attempt to eradicate them, seemed to be a game well worth the candle' (1991: 23). In his refresher lectures, he explored the relation between accounting information and its internal and external users, including contemplations on how best to reflect the effects of the postwar inflation in accounting reports.

In 1953, he moved to the University of Sydney as senior lecturer in accounting, the first full-time appointment in accounting at the university, even though the subject had been taught there since 1907 (Brown, 1982: 100). A scant two years later, he was promoted to associate professor of accounting, the first appointment at that level in accounting at any Australian university.[45]

It was in the mid-1950s that Chambers took the first bold step to erect his theory as well as to repair the literature. He has written as follows:

'The textbooks and much of the periodical literature of the fifties gave the impression that most writers were too fond of prescribing to spend time or energy in observing what was going on about them. The literature was dogmatic. Many of the things being done in practice were either disregarded or dismissed as improper. Some of the literature purported to be theoretical. But [it] was short on analysis, loose in argument and ambivalent in conclusion. I proceeded with two kinds of work in parallel[:] observing accounting practices and their consequences, and trying to put into some coherent order the general ideas which were held to constitute the theory of accounting.' (1974a: viii)

His first major article on theory construction, as well as his first paper published outside of Australia, was 'Blueprint for a Theory of Accounting', which appeared in the British journal *Accounting Research* (1955a). He later described it as

'a tentative expression of my aim and method. It stated that the foundations of a theory of accounting lie in the environment of economic realities; that there is a need for a general theory of accounting which would provide the basis for theories specific to different classes of entities; and that, on grounds of usefulness, accounting summaries should be expressed in currently relevant terms' (Chambers, 1962: 46).[46]

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[43] Through a series of amalgamations, the Institute eventually became part of the Australian Society of Accountants, which is known today as CPA Australia.

[44] For his further reflections on this period of 'apprenticeship', see Chambers (1991) and (2000).

[45] Louis Goldberg, at Melbourne, was the next associate professor, in 1957.

[46] This unpublished paper was written in 1962 and is reproduced, together with the rest of Chambers' papers, in Chambers and Dean (1986/2000).

He began by quoting John B. Canning's observation that 'the accountants have no complete philosophical system of thought about income nor is there any evidence that they have ever felt the need for one' (1955a: 17). Chambers was critical of accounting writers who seemed content to describe practice rather than propound 'a theory of accounting' (pp. 17–18). He then demonstrated how a theory might be constructed, and he proposed and defended a set of four propositions that 'lie outside of the field of accounting proper' (p. 19) together with several implied corollaries. A. C. Littleton, who viewed accounting theory as a distillation of accounting practice, responded with two articles in which he criticised Chambers' view that a theory could be framed without reference to this practice (1956a; 1956b). In particular, he objected to Chambers' suggestion that a technology of price-level adjustments should be injected into accounting, an alien ideology that Littleton had opposed during his long and distinguished career. Littleton deliberately published one of his two articles in *The Australian Accountant*, on Chambers' home turf.

Also in 1956, by coincidence, Chambers published a detailed and critical review of Littleton's *magnum opus*, *Structure of Accounting Theory* (1953), in *The Accounting Review*, the journal that Littleton had edited in the 1940s. It was Chambers' first article published in the US. Although he praised Littleton in the initial paragraphs, he could find little to praise in the monograph itself. Finally, he wrote, perhaps in exasperation, 'The general purport of *Structure of Accounting Theory* is to demonstrate the propriety of conventional business accounting method' (p. 590). Chambers' and Littleton's domains of enquiry were fundamentally different, and criticism across the methodological divide can hurt to the quick.

In 'Detail for a Blueprint' (1957a), Chambers replied to Littleton (1956b) on the latter's home turf, *The Accounting Review*. Showing supreme confidence, he dismissed Littleton's points one by one, and he claimed that Littleton's defence of historical cost accounting 'is an excellent example of what is a very common logical fallacy: *post hoc ergo propter hoc*' (p.211). He remarked that 'Professor Littleton's approach to accounting is essentially pragmatic,' one, he said, that 'leads to oversimplification' (p.214). Aged 39 and not yet a full professor, Chambers had bearded one of the lions of US academic accounting, a professor *emeritus* who had just been inducted into the Accounting Hall of Fame. Littleton never came to terms with Chambers' criticism, which he took as an affront.[47]

The second half of the 1950s and the early 1960s were an especially busy time for Chambers. He published two books, *The Function and Design of Company Annual Reports* (1955b)[48] and *Accounting and Action* (1957b), gave three research lectures, wrote some two dozen articles, and at Sydney introduced an honours programme in accounting. In 1958–1960, he played a leading role in the founding and establishment of the AAUTA, and he served as its first president in 1960–1961 (Goldberg, 1987: 13–48). In 1960, he became Sydney's first professor of accounting, and he began 15 years as head of the new department of accounting. His teaching staff in accounting was still small: one senior lecturer and three part-time lecturers (Brown, 1982: 101). In 1962, in order to foster a dialogue between academic and practising accountants, Chambers founded the Sydney University Pacioli Society (Wolnizer, 2000: 2).

In 1959 and 1962, Chambers took extensive trips overseas, visiting many universities, spending two months as a consultant on the research staff of the US Accounting Principles Board (APB),[49] and attending the Eighth International Congress of Accountants and the annual meeting of the American Accounting Association.[50] *Accounting Research* had ceased publication in 1958, and during his tour in 1962 he began to look into establishing a journal to fill the void. At one time, he considered co-sponsoring, together with the London School of Economics, the new *Journal of Accounting Research*, which the University of Chicago launched in 1963 (Davidson, 1984: 283–284), but instead, with the support of Goldberg, Mathews and Roy Sidebotham (of Victoria University of Wellington, New Zealand), who composed the editorial board, he opted to found his own journal, *Abacus*, in 1965 (Brown, 1982: 101; Wells, 2000). It was a characteristically bold scheme, as the output of academic accounting research in Australia and New Zealand probably could not have justified an antipodean journal. To provide a broader net, *Abacus* was styled as 'A Journal of Accounting and Business Studies', and four of the 10 main articles in the first two issues fell in the latter category.[51] Chambers served as editor of the journal until 1974, and he continued as an active 'editorial con-

[47] Interview by Zeff with Littleton, July 1964.

[48] A reviewer in *Accounting Research* wrote, 'This interesting book by Professor Chambers is the only one known to the reviewer that attempts exhaustively to examine the case for giving copious individual accounting information to a wider audience than receives it under the present practice' (Nightingirl, 1956: 399).

[49] For a recollection of Chambers' visit to the APB's research staff, see Moonitz (1982).

[50] For a report on his 1962 trip, see Chambers (1963a).

[51] For a discussion of the difficult, early years of editing *Abacus*, as well as the events that led up to its founding, see Chambers (1969a) and Wells (2000).

sultant' until his death (Dean, 2000: ii).

During the early 1960s, Chambers published three important papers dealing with the content and method of his emerging theory. Pride of place belongs to the monograph based on his research lecture at the University of Adelaide, *Towards a General Theory of Accounting* (1961). Russell Mathews, who invited Chambers to deliver the lecture, regarded this monograph 'as the watershed between the old style of pragmatic accounting and the new theoretically based accounting in which Chambers was to play such a dominant role in developing it during ensuing years' (1982: 177). He added that 'it was not until 1961 that I came to full realisation that Chambers was an intellectual giant, who was in the process of transforming accounting from a technical set of arbitrary rules into a rigorous conceptual framework and measurement system' (p. 177). This 48-page monograph anticipated his *Accounting, Evaluation and Economic Behavior (AEEB)* (1966b) both in content and method: it was a densely written, tightly logical exposition (a 'layer cake', as he called it) of 40 foundational statements, or postulates, about the characteristics of the world of action, together with 21 derived statements, or principles, related to accounting.[52] Mathews recalled, without exaggeration, that 'The lecture itself left the audience somewhat bemused, because the structure of ideas and the complexity of the theoretical framework developed by Chambers could not be easily grasped from an oral presentation' (p.177). The publications committee of the Australian Society of Accountants, which sponsored the lecture, 'decided that it was not prepared to publish the lecture in any form', and it was finally published only at the insistence of the University of Adelaide, and was partially subsidised by Chambers (p.177). One important difference between the 1961 monograph and *AEEB* was the former's adoption of replacement cost as the valuation system for non-monetary assets. Chambers' important transition from replacement prices to resale prices is discussed further in Section 4.3.

The year before his research lecture was delivered, Chambers published 'The Conditions of Research in Accounting' (1960), which outlined the scientific method he would use in the lecture. He wrote another methodological piece, 'Why Bother with Postulates?', in the inaugural issue of the *Journal of Accounting Research*, in which he argued, somewhat in reaction to Moonitz (1961), that it is necessary 'to consider a whole system of postulates and a conclusion together'. 'There is', he said, 'no such thing as a set of postulates which is independent of a set of conclusions or principles or hypotheses' (1963b: 13).

In the 1960s, Chambers critically analysed the ideas of leading writers in several papers: 'The

Resolution of Some Paradoxes in Accounting' (1963c), 'Conventions, Doctrines and Common Sense' (1964b) and 'The Development of Accounting Theory' (1965b). In the 1960s and 1970s, he wrote penetrating review articles on the treatises by Edwards and Bell (1965a),[53] Mattessich (1966a), Fisher (1971a), Ijiri (1972b) and Canning (1979), as well as on the American Institute of Certified Public Accountants' accounting research studies 1 and 3 on postulates and principles (1964a), 6 on price-level accounting (1966d), and 7 on generally accepted accounting principles (1966c). All of these articles repay a careful reading by anyone seeking a deeper understanding of the works, as they well typify Chambers' laser beam of analysis. While he liked to say that he had no more than a 'spotty' understanding of others' writings,[54] he was indeed a thorough and incisive analyst of every work that he addressed.

In February 1966, Prentice-Hall published Chambers' monumental work, *Accounting, Evaluation and Economic Behavior (AEEB, 1966b)*. It embodied his complete theory of accounting, which he called Continuously Contemporary Accounting. As an ideal, Chambers rejected replacement cost in favour of 'current cash equivalents', or selling prices – also known as exit values, a term coined by Edwards and Bell (1961: 79). Yet he 'resorted to replacement prices as a means of getting an approximation to current cash equivalents on an ideal basis, both when dealing with short-term inventories and when suggesting methods of obtaining evidence of current resale prices of durables...' (1966b: 249). His overriding concern was to provide accounting information that was relevant to the firm's capacity for adaptation to changes in its environment, and he concluded that, in principle, only 'current cash equivalents' would suffice.

Chambers had signed the contract with Prentice-Hall in 1962, when visiting the US, and the writing of the manuscript occupied all of 1963 and 1964 (Chambers, 1974a: xiv). Like his 1961 research lecture, but on a much larger scale, the book was densely written and, from the most primitive propositions to the conclusions and implications for accounting, was rigorously logical. At the end

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[52] Chambers has said that his curiosity about how people act, i.e., solve problems, was 'sparked off' in part by a high school mathematics teacher who brought into his class a number of logical word problems, which, he said, were exercises in mathematical analysis. (Interview by Zeff with Chambers, 14 January 1967.) In the same interview, he cited von Mises (1949) and Robbins (1932) as being particularly influential in the development of his ideas in the 1961 research lecture.

[53] In 1982, Chambers continued his analysis and criticism of Edwards and Bell (1961) and included later writings by both Edwards and Bell.

[54] Interview by Zeff with Chambers, 14 January 1967.

of the chapters, he summarised the argument by concisely stating more than four hundred postulates and definitions as well as inferences and conclusions. He dutifully traced his methodological and theoretical debt to philosophers, linguists, psychologists, decision theorists and scientists (among others), and, on matters close to accounting he drew on the economics, finance and accounting literatures. It was a weighty and intricately woven tome. (For a further discussion of *AEEB*, see Section 4.3.)

The reviews were admiring but critical (McDonald, 1966; Wright, 1966; Dein, 1966; Solomons, 1966; Cruse, 1967; Benston, 1967; Hendriksen, 1967; Baxter, 1967). In his review, Wright said that 'the author has struck an important blow for the adoption of contemporary prices as the basis of accounting: the care with which he has developed the logical structure of his argument will make it impossible to dismiss his conclusions, and difficult to demolish them' (1966). Yet Chambers had opened himself to criticism for accepting replacement prices when resale prices were not readily available for short-term inventories. In 'Second Thoughts', his first general reply to his critics, Chambers responded by coming down unequivocally in favour of resale prices for all classes of inventory (1970). This, and related issues, are discussed in Section 4.3.

In 1967, *AEEB* was honoured as a Notable Contribution to the Accounting Literature, a recognition jointly conferred by the American Accounting Association and the American Institute of Certified Public Accountants. Two years later, Arthur Andersen & Co. paid him the unique tribute of reprinting more than 50 of his papers in a volume entitled *Accounting, Finance and Management* (1969b). In 1973, the University of Sydney conferred upon Chambers a Doctor of Science in Economics (D.Sc.Econ.) degree based on *AEEB* and his other published writings.

From the late 1960s onward, Chambers battled against 'value to the business' (1971b), multiple column reporting (1972a; 1972c), both general purchasing power accounting and current cost accounting (e.g., 1967a, 1975a, 1976c, 1978a),[55] the argument that it is impossible to set an accounting standard that would be preferred by all individual users (1976b), and both market-based research and positive accounting theory (1993). Numerous writers crossed swords with Chambers in the literature, but few would take him on in seminars or conferences. He was a formidable debater, and any concessions he might make, and they were few, were well disguised in return thrusts of his own. Some found his manner at times to be disdainful, although he loved a good argument. Mathews wrote that, 'An adversary could be irritated by the sense of superiority or even condescension which

Chambers sometimes displayed in his writings, but his arguments could never be ignored' (1982: 176–177). We shall see later, in our discussion of the debate between Chambers and Gynther, how provocative Chambers' style of debate could be.

In 1976, Chambers was the first person chosen by the American Accounting Association to tour North American universities as Distinguished International Visiting Lecturer. In 1977–1978, he served as national president of the Australian Society of Accountants. And in 1978 he was honoured with an AO.

Chambers devoted much of the remainder of his career to replying to critics, clarifying his views, and, with unflagging energy and missionary zeal, advocating the acceptance of his views by all concerned (e.g., see Chambers, 1970, 1974b, 1975b, 1976d, 1978a), publishing articles and lecturing throughout the world.[56] In a book, *Securities and Obscurities*, he used an earthy approach to enlarge the audience for his reformist theory. Rather than restate his elaborate theoretical argument, he instead examined scores of opinions of analysts, journalists, economists, accountants, executives, jurists and other classes of commentator to demonstrate that 'the existing [accounting] practices, even of companies that are well esteemed, are inadequate, uninformative, and often obscurantist...[and to establish] a case for the reform of present laws and practices' (1973: ix).

Chambers' major accomplishment, in terms of practical effect, was to secure a serious consideration of exit value by accounting academics (especially in their teaching and in their textbooks on accounting theory) and by accounting policy makers and governmental committees of enquiry in the US, UK, Canada, Australia and New Zealand (for particulars, see Zeff, 2000: 8–9). Moreover, in the mid-1970s, five New Zealand companies, including the country's second largest corporation, adopted 'continuously contemporary accounting' in a supplementary exhibit to their annual financial statements, and Chambers was brought in as a consultant (Trow and Zeff, 1976: 342; Chambers, 1976a).

He retired from the university in 1982 and was made professor *emeritus*. But that act of retirement, required by university statute, did not slow

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[55] After hearing Chambers' demonstration, by 'resolute inquiry', that his 'continuously contemporary accounting is logically and practically imperative' and that it, and only it, meets the criteria of a superior accounting system (1967: 26, 42), the American theorist Carl L. Nelson remarked that Chambers' presentation 'is the proclamation of an impatient individual – a person who is far more impatient than would be expected of the author of *Accounting, Evaluation and Economic Behavior*' (1967: 50).

[56] *Abacus*, however, was by far the predominant place in which his work was published, with 30 articles appearing there between its first volume in 1965 and 2000.

his pace of production. Chambers continued to speak and publish extensively into the 1990s. In 1995, he published a mammoth thesaurus covering 500 years of accounting, a work that only he could have produced. His encyclopaedic knowledge of the accounting literature, as well as his deep and abiding interest in the evolution of ideas, are richly on display in this beautifully crafted work. It was a fitting valediction to a career devoted tirelessly to the improvement of the accounting discipline.

In 1991, Chambers received two accolades. He was chosen by the American Accounting Association to receive an Outstanding Accounting Educator Award, and he was inducted into the Accounting Hall of Fame. He was the first recipient of the AAA award not from a US university and was only the second member of the Hall of Fame from outside of North America. In 1996, the Accounting Association of Australia and New Zealand (successor to the AAUTA) gave Chambers one of its two inaugural awards for Outstanding Contribution to the Accounting Research Literature ('AAANZ Outstanding Contribution...', 1996).

The final tally of Ray Chambers' published writings was 'a dozen books and well over 200 articles, monographs and reports on accounting, financial management and the law...' (Wolnizer, 2000: 1). Few have had the impact on students, on colleagues and on the field as Chambers.[57] He was a stimulating figure, always questioning, always probing. A Festschrift was published in the December 1982 issue of *Abacus*, the journal he founded, and a second appeared in its October 2000 issue. Ray Chambers died on 13 September 1999.

4. Contributions to the debate on price change accounting

The names of Chambers, Gynther and Mathews are inextricably linked with the debate on price change accounting that raged (not too strong a word) in the 1960s and 1970s. This extended far beyond Australia, but Australia made a disproportionately large contribution to the international debate, and these three authors were at the heart of the Australian contribution. It therefore seems to be appropriate to recount and assess their individual contributions to this debate, and some controversies that took place between them. It should also be recognised, however, that, as indicated earlier in this paper, their contributions extended far beyond price change accounting. Russell Mathews was primarily concerned with public finance issues and spent a substantial part of his career in posts that focussed on such issues. Reg Gynther entered the academic profession relatively late in his career and left it while still in his prime to take

up a research post with a leading firm of chartered accountants. Ray Chambers had a long career as an academic accountant, stretching beyond his formal retirement, but he contributed to all aspects of accounting and certainly did not confine himself to price change accounting.

Before embarking on a discussion of price change accounting, it is perhaps worth recalling the importance of this subject both in practice and in academic debates of the 1960s and 1970s. A comprehensive history of the subject is provided in Tweedie and Whittington (1984).

The practical impetus for the debate was the persistent inflation that developed in most free-market economies as a result of the Keynesian economic policies adopted after the Second World War. We have already seen that this gave rise to the policy problems that Mathews and Grant (1958) sought to address. There were similar studies in other countries, such as the US and the UK, which faced similar problems at the time. The rate of inflation accelerated in the 1960s, when professional bodies, particularly in the English-speaking countries, started to take an interest in recommending the adjustment of accounts by general price indices. Inflation in these countries continued to accelerate, reaching a climax in the mid-1970s, by which time governments had started to take an interest in the price-adjustment of accounts for taxation and other purposes (e.g., the appointment of the Sandilands Committee in the UK, the Mathews Committee in Australia and the Richardson Committee in New Zealand). These Government-appointed bodies advocated the adjustment of accounts by specific price indices rather than general indices. A fierce international debate followed, with the result that accounting standards incorporating specific price adjustments were issued in the US in 1979 and in the UK in 1980, and similar proposals were planned in other countries. However, both the US and the UK standards were unpopular with preparers of accounts and, at the time they were issued, inflation rates were falling rapidly under the influence of the new 'monetarist' macro-economic policies, based on restricting government expenditure and strict control of the money supply.

As a result of this, the impetus for comprehensive price change adjustment of accounts was lost: the UK and the US standards were withdrawn and other countries did not issue their planned standards on the subject. An exception was Latin America, where hyper-inflation justified requirements for general index adjustment of accounts in

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[57] Among Chambers' leading intellectual disciples are Frank Clarke, Graeme Dean, Atiq Islam, John Staunton, Murray Wells and Peter Wolnizer. Many others were much influenced by Chambers, including Michael Gaffikin, Sidney Gray, David Johnstone, Hector Perera and Robert Walker.

certain countries into the 1990s (Tweedie and Whittington, 1997).

The academic debate on price change accounting can be traced back to the beginning of the twentieth century (Tweedie and Whittington, 1984: ch. 2) so that Chambers, Gynther and Mathews were able to draw on a substantial existing literature. The debate was international, and they were also able to interact with scholars in many other countries. The debate was concerned with the choice of index to be used for price adjustment: should it be an index of general purchasing power or a specific price index, representing the price of a particular asset?

There were two distinct strands to this debate, the valuation of specific assets (and, where the value was not fixed in nominal terms, liabilities) and the measurement of capital for the purpose of calculating income. Our trio were agreed that valuation should be based on specific prices (or specific price indices) rather than using a general purchasing power index to adjust historical cost. They disagreed on the issue of which specific price should be used: Mathews and Gynther preferred replacement costs (entry values) whereas Chambers preferred selling prices (exit values). With regard to the measurement of capital for determining profit, Mathews and Gynther believed that this should be based upon maintaining the productive capability of the business entity (which implied a replacement cost adjustment), whereas Chambers believed that it should be based upon preserving the real purchasing power of the net assets attributed to proprietors (which implied a general purchasing power index adjustment).

The solution to the price-change problem that, briefly, appeared likely (in the late 1970s) to become adopted in practice was Current Cost Accounting (CCA). This was based on valuing assets at value to the business rather than replacement cost. Value to the business is replacement cost except when replacement cost is not recoverable either by use (the net present value of cash flows obtainable from continued use in the business) or by sale (the net realisable value obtained by orderly disposal). Thus, value to the business will be replacement cost in most realistic situations (Gee and Peasnell, 1976) and can be viewed as replacement cost, moderated by an impairment test. It can therefore be seen that the CCA valuation method was close to that preferred by Mathews and Gynther and distinctly different to that preferred by Chambers. The same can be said of the CCA capital maintenance concept. CCA operating profit, as advocated in UK's Sandilands Report (1975), corresponded with Mathews' preferred concept of capital maintenance. Later variants of CCA, such as the New Zealand Richardson Report (1976) and the UK's Statement of Standard

Accounting Practice (SSAP) 16 (1980) incorporated monetary working capital and gearing adjustments which captured the effects of changing prices on monetary assets and borrowing, but in terms of specific prices (those of the specific assets used and traded in by the entity). These were accepted by Mathews (although they did not feature in his earlier contributions), and welcomed by Gynther (who had adopted monetary working capital adjustments from his early study of the Philips system), but were anathema to Chambers.

In considering the contributions of the trio to price change accounting, we shall first consider their individual contributions. Russell Mathews will be discussed first, because he was chronologically the first to make a major contribution to the area. Then we shall consider Reg Gynther, because his work grew out of a thesis supervised by Mathews of whom he might be described a follower (but not a disciple). Finally, we shall consider Ray Chambers, who adopted a different approach to the other two (preferring exit values to entry values) and clashed with both of them. Having considered each individually, we shall go on to consider the clashes between Ray Chambers and Russell Mathews in 1965–1968, and between Ray Chambers and Reg Gynther in 1971–1972. We shall conclude with some observations on the impact of their respective contributions on accounting thought and practice at the beginning of the 21st century.

4.1. Russell Mathews and Replacement Cost Accounting

Although Russell Mathews devoted most of his considerable energies to public finance issues, price change accounting was an important theme in his academic writing, not least because of its relevance to public finance, through its implications for the basis of corporate taxation.

The particular form of price change accounting preferred by Russell Mathews is best described as replacement cost accounting, rather than current cost, because he was reluctant to embrace the eclectic 'value to the business' principle supported by most advocates of current cost (e.g. the Sandilands Report, 1975). His basic approach was that price changes rendered historical cost irrelevant to current decisions, and that appropriate corrections to historical cost profit could be achieved by two simple adjustments, based on current replacement costs, a cost of sales adjustment (whose effect was to charge stocks used at current replacement cost rather than historical cost) and a depreciation adjustment (reflecting the difference between the current replacement cost of fixed assets consumed and their historical cost). He rejected general index adjustments of monetary assets and claims or of proprietors' capital, on the ground

that they were irrelevant to the needs of a continuing business entity.

These views crystallised early in Mathews' academic career, notably in his book written with the economist John McB. Grant, who was his colleague in Adelaide (Mathews and Grant, 1958). This book represented work done from 1954 onwards and was Mathews' most substantial contribution specifically to price change accounting. It reported an empirical study of the Australian company sector in the period following the Second World War. The cost of sales adjustment and stock adjustment were estimated, using specific indices and assumptions about asset ages, and the consequent effects on the measurement of retained profits were calculated. The purpose was to consider dividend policies, tax policies and pricing policies in the light of the revised information. The conclusion of the study was that the incorporation of these adjustments in company accounts to yield what the authors described as 'current income' would provide a safeguard against over-distribution of dividends and a more equitable tax base: 'current income is a measure of the income that is available for distribution, so that both taxes and dividends should be related to it' (Mathews and Grant, 1958: 3). The study also concluded that replacement cost pricing would lead to a more efficient allocation of resources in the economy.

Of equal importance for present purposes is the theoretical basis of the study. The authors approached the problem as economists, asking questions that are important for the economy as a whole, as well as for individual companies. Mathews himself had done his honours thesis at the University of Melbourne on a topic in national income accounting,[58] and his first publications were in this field. It is therefore perhaps natural that, in adjusting business accounts for price changes, he should resort to precisely the same adjustments as are used in national income accounting, the elimination of stock appreciation and the re-statement of depreciation at replacement cost. These adjustments are designed to measure income after the maintenance of the productive capacity of the entity, whether at the level of the nation or of the individual firm.

Mathews and Grant rejected the use of general indices for adjusting the values of physical assets (Mathews and Grant, 1958: 20–21), and more importantly they rejected the use of general indices for adjusting owners' capital and monetary assets and liabilities (pp. 21–23). The latter followed naturally from their view that capital maintenance should be concerned with the physical assets of the entity:

'...there are strong practical grounds for accepting accounting procedures designed to maintain the real value of capital invested in physical as-

sets, but it is difficult to justify accounting procedures designed to preserve the purchasing power of cash resources and money claims'. (Mathews and Grant, 1958: 22)

The only role acknowledged for general price level adjustment was for comparison of incomes *between* years (not their calculation *within* years), 'but this is a task for the statistician rather than the accountant' (p. 23). Again, this is consistent with the approach of national income accounting, in which general price level adjustments are used to construct series of 'real GNP' to produce appropriate measures for inter-year comparison.

It was this strong stance in favour of replacement cost adjustments that led to Russell Mathews' next important contribution to the price change accounting debate. This was his critique (1965a) of an important American study (Staff of the Accounting Research Division, 1963) (ARS 6), which recommended general price-level adjustment of business accounts to reflect the impact of inflation. The title of Mathews' critique was both blunt and pertinent: 'Price-Level Changes and Useless Information'. The burden of the argument was that ARS 6 had been wrong to give priority to general price-level adjustment. Rather, adjustments for the specific price changes of the operating assets of the business should have been the main focus, to yield an operating income measure like that advocated by Mathews and Grant (1958). General price level adjustments were given a secondary role: '...adjustments designed to measure changes in the general price level only acquire meaning if they are calculated by reference to data which have themselves been valued on a consistent basis' (Mathews, 1965a: 136). Furthermore, the general price level adjustment was merely to aid inter-year comparison and was 'of relatively minor significance' (p. 137). The idea of restating owners' equity by general price level changes to maintain the real purchasing power of capital was firmly rejected, as were the related concepts of reporting a real gain on borrowing or loss on holding money in a period of inflation.

Mathews' trenchant critique of ARS 6 attracted critical response from three commentators, one of whom was Raymond Chambers. The Chambers-Mathews exchange will be considered in more detail later. For the present, it should be noted that this hinged primarily on Mathews' insistence on a physical capital maintenance concept and rejection of general price level adjustment for this purpose. Chambers, always a shrewd judge of his opponents' strengths and weaknesses, noted that Mathews' approach to income measurement was more suited to national income accounting than

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[58] Interview by Whittington with Allan Barton, July 2000.

business accounting (Chambers, 1967b: 216).

The final important contribution by Russell Mathews to the price change accounting debate was associated with the Mathews Report on Inflation and Taxation (1975). This report made recommendations about the Australian system of taxation in the context of the inflation of the early 1970s, which was more severe than that in the immediate post-war period studied by Mathews and Grant (1958). The section of the Report that dealt with business income taxation was obviously relevant to the price change accounting debate. The conclusion was consistent with the earlier views of the Chairman: for taxation purposes, companies should be allowed to deduct from their historical cost profit two adjustments, a cost of sales adjustment (equivalent to the increase in the replacement cost of stocks during the period) and a depreciation adjustment (equal to the excess of replacement cost depreciation of fixed assets over the historical cost depreciation). This recommendation was very similar to that of the Sandilands Committee (1975) in the UK which reported a few months later, although the latter was in favour of 'value to the business' as the measurement method, whereas the Mathews Report favoured the narrower replacement cost method.[59] The Mathews Report, unlike the Sandilands Report, was addressed specifically to taxation, rather than the wider issue of financial reporting, but Mathews made clear that he would have preferred the proposed system to be adopted for financial reporting as well as taxation. He later expressed the view that the failure of the Government to implement the Report was encouraged by the failure of business to adopt the proposals for financial reporting purposes (Mathews, 1980: 268–269)

The Mathews Report suffered a similar fate to the Sandilands Report. It led to no significant or lasting changes in the Australian system of company taxation, which dealt with inflation in the short term by a temporary stock appreciation relief, similar to that introduced in the UK. As in the UK, the pressure for reform of the tax base was lessened by the falling rates of inflation. Both reports were influential in the subsequent debate on the use of current cost accounting for financial reporting, which led, briefly, to professional recommendations for current cost accounting, although in both countries (and especially in Australia) the success of current cost was limited and short-lived (Tweedie and Whittington, 1997).

In the aftermath of the Mathews Report, Russell Mathews contributed further to the price change accounting debate. He welcomed the Richardson Report (*Report of the Committee of Inquiry into Inflation Accounting*, 1976), which recommended a form of current cost accounting for use in New Zealand (see Mathews, 1977). In doing this, he

commended the use of the gearing adjustment, which was proposed by the Richardson Report. This adjustment was considered in the Mathews Report but did not feature in its final recommendations and had not appeared in Mathews' earlier writings. It represents a specific price adjustment method of dealing with the gain on borrowing and loss on holding monetary assets that results from inflation. His acceptance of this adjustment demonstrates his strong commitment to the physical capital maintenance approach to income measurement even when calculating income attributable to proprietors.

It was this latter commitment that gave rise to his last serious public debate on price change accounting. In 1978, Peter Swan, then an economist at the Australian National University (and a son of T. W. Swan, who provided some of the models used in the earlier Mathews and Grant study), published a highly critical review of the Mathews Report's recommendations on business taxation. His criticisms were based upon a rigorous neoclassical economic model of the firm and this led him to advocate a general price level adjustment of opening capital, as in Ray Chambers' Continuously Contemporary Accounting (CoCoA) system (Swan, 1978: 9), although it was the capital maintenance model with which Swan was concerned, rather than the choice between current entry value (preferred by Mathews) and current exit value (preferred by Chambers). Thus, Swan rejected Mathews' physical capital maintenance concept, concluding that it represented 'an emotional crusade in which "business survival" has replaced the holy grail' (Swan, 1978: 13). Essentially, Swan's argument was that rising replacement costs did represent a gain to the firm if they could be passed on to the consumer, albeit that the gain might be reduced in real terms by a decline in the purchasing power of money (which would be captured by a general purchasing power adjustment). There would be no consequent financing problem, as visualised by the Mathews Report, if prices yielded sufficient expected profit to justify new investment: if necessary, such investment could be financed by the capital market.

A related criticism by Swan was of the Mathews Report's failure to deal with monetary assets and liabilities properly. During periods of inflation, the so-called Fisher Effect produces a gain on borrowing or loss on holding monetary assets, which represents the difference between nominal and real interest rates (Swan, 1980: 270–271). This effect is most naturally expressed in terms of general price

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[59] The two will, of course, typically lead to the same result. The similarities between the recommendations of the Mathews Report and the Sandilands Report were possibly enhanced by contact between the two committees (Tweedie and Whittington, 1984: 80).

level indices, because it is concerned with the purchasing power of money rather than the cost of a specific bundle of assets. The Mathews Report did not recommend any adjustment for this effect, and the only adjustment it considered to be possibly appropriate was the gearing adjustment.

Mathews' reply to Swan (Mathews, 1980) is instructive as an illustration of his underlying assumptions and objectives. He explicitly appealed to the methods of national income accounting (p. 262) as authority for his approach of maintaining physical capital. He emphasised that 'the notion that under conditions of rapid inflation, a liquidity or cash flow problem is inherent in a system of historical cost accounting, pricing and taxation was central to the Committee's argument, and it is not possible to rebut it by asserting that the problem can be overcome by raising fresh capital' (p. 263). The latter was supported by an appeal to the depressed state of the capital market, which made it impossible for firms to raise additional funds. Equally, he questioned the practicality of firms being able to raise prices sufficiently to compensate for higher replacement costs if they were not given additional tax relief to reflect those costs. Finally, in response to the argument that appreciation in asset values constitutes a gain to proprietors, he wrote, 'it is difficult to conceive of any action which would be more damaging to the Australian economy and its competitive position than the inclusion in taxable income of the unrealised appreciation which has occurred in the depreciable assets held by business enterprises' (p. 267).

His reply to Swan shows that he approached the problem from the perspective of economic policy rather than economic theory. His reasoning was conducted within the practical constraints facing the policy-maker, and he assumed frictions and imperfections in the financial system which were inconsistent with Swan's theoretical model (p. 263). He was also concerned to construct a tax system that would work more effectively than the one in place, rather than attempting to achieve optimality, which he regarded as impractical. His concerns were as much macro-economic as micro-economic. The central concern of his Committee was 'with the maintenance of financial stability in the business sector, with continuity of business investment and operations, in short with business survival' (p. 263). In summary, Mathews adopted a Keynesian view of the economy, which regarded disequilibria and market imperfections as normal facts of economic life, creating a need for government intervention in order to correct them.[60]

Swan's rejoinder (Swan, 1980) re-iterated a number of points of logic which he felt that Mathews had not addressed, notably on the Fisher Effect, but the debate ended on a suitable note of

agreement, in that both parties agreed that a proportional consumption tax would provide an effective and simple substitute for both the personal income tax and corporate profits tax (p. 276).

This exchange was Russell Mathews' final contribution to the price change accounting debate, and it illustrated both the strengths and the weaknesses of his current cost accounting model. These were explored further in the work of his pupil, Reg Gynther, to whom we now turn.

4.2. Reg Gynther and the entity approach to price changes

We have seen that Reg Gynther came late to academe, taking his first full-time academic post at the mature age of 37. He acknowledged that his view of price change accounting was shaped by his practical experience as an accountant in business. This led him to adopt the 'entity' view of price change accounting, which is the perspective of the manager rather than of the shareholder or proprietor.

Like Mathews, Gynther produced a major work on price change accounting early in his research career. This was *Accounting for Price-Level Changes: Theory and Procedures* (Gynther, 1966). It was developed from his master's thesis for the University of Adelaide, and its central ideas were developed from an article published earlier in *Accountancy* (Gynther, 1962). This was supervised by Russell Mathews, and the assistance of both Mathews and Grant (as external examiner) is acknowledged in the preface. Thus, Mathews must have exercised some influence over the development of the work, despite the fact that the degree was taken on a part-time basis and at long distance (Mathews being based in Adelaide and Gynther in Brisbane). Certainly, the conclusions of the work, favouring specific replacement cost adjustments and rejecting the use of general price level indices, were consistent with the approach of Mathews and Grant. On the other hand, Reg Gynther was very much his own man, and he may have chosen his supervisor to match his well-developed interest in replacement cost accounting, which had developed from his commercial experience and his contact with the Philips system.

Whatever the origins of Gynther's interest in replacement cost accounting, his book (Gynther, 1966) became a standard source of reference on the methodology of replacement cost accounting, and it also contained most of the ideas that he developed further in his later work. Whereas Mathews and Grant's work had been concerned with aggregate adjustments to the accounts of the

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[60] This view of Russell Mathews' economics was confirmed by an interview in August 2000 with Geoff Harcourt, *emeritus* professor of economics at Adelaide.

company sector, using two simple adjustments and making a number of fairly heroic simplifying assumptions, Gynther was concerned with detailed replacement cost adjustment of the accounts of the individual company. He modelled his work on a study of the Philips system and, consistent with the approach of Limperg's Amsterdam School, was concerned that replacement costs should be recorded throughout the accounting system, as an aid to management as well as for external reporting purposes. Thus, the final four substantial chapters of his book (Chs 12 to 15, inclusive) are devoted to matters of practical application (such as the choice between average and end of period prices, Ch. 12), including a case study of the application of current cost accounting in Philips Electrical Industries (Ch. 15). His book was shaped in two respects by his extensive practical experience in business. First, as we have already observed, his attachment to replacement cost arose out of his adoption of the perspective of the manager, rather than of the shareholder. Second, he approached the problem of replacement cost adjustment at the detailed level of the accounting system (illustrating many of his points by means of journal entries) rather than as a matter of adjusting the summary financial statements. In this respect he was a true accountant, like Chambers, with whom he was to debate strenuously on the relative merits of replacement costs and selling prices as the basis of valuation:

'It is believed that the main purpose of maintaining accounting records is to provide management with vital information to assist it in its day-to-day functions of planning, controlling and making decisions to increase the performances and efficiency of its entity'. (Gynther, 1966: 3)

The theoretical core of Gynther's work was based upon his *entity* perspective of the firm. He (like Mathews) was concerned with the preservation of the business entity (as expressed in an operating capability concept of capital maintenance) rather than with the maintenance of shareholders' wealth, in real or nominal terms. He expressed this perspective with admirable clarity and candour in his book, and this was one of his important contributions to the price change accounting debate, although a controversial one. Associated with this view was his belief in using *specific* prices, where possible, and, in their absence, specific indices, for the re-statement of accounts: 'The more specific the available information is the better, and the more accurate the accounting will be as far as each firm is concerned' (Gynther, 1966: 55). This specific approach was to apply both to balance sheet valuations and to the restatement of opening capital:

'When the specific current cost of either an inventory item or a fixed asset item rises or falls, it

costs more or less to be in that kind of industry. To treat any part of such a rise or fall as a profit or a loss is tantamount to looking at the rise or fall in prices through the eyes of a shareholder (or other outsider) and not from the viewpoint of the firm as a going concern'. (Gynther, 1966: 68)

He did, however, express approval of the work of Edwards and Bell (1961) and, perhaps as a concession to their approach, he accepted that it would be possible, although not desirable in the financial statements, to use general index adjustment of shareholders' funds, which would be offset against nominal holding gains and losses on real assets, to provide a measure of real holding gains, which could be added to profit 'for those with a general index concept of profit, i.e., for those with a proprietorship outlook' (Gynther, 1966: 81). However, he added a stern warning that, in his view, all such transfers to or from reserves should not affect the profit calculation but should instead be treated as appropriations of profit:

'Any such further transfers have nothing to do with the determining of profit itself. Such attempts to protect shareholders' funds are financing problems only'. (p. 81)

The specific index approach posed particular difficulties for the treatment of current monetary items. Gynther showed himself to be a pioneer of the 'monetary working capital adjustment', a feature of the current cost accounting (CCA) systems, which were later adopted by professional bodies:

'...the specific-index man treats as profits and losses the *total* movement (up or down) in the relative specific indexes that he associates with the monetary items'. (p. 139)

Thus, Gynther would apply to the net current working monetary asset pool (current assets less current liabilities) a specific index, related to the firm's purchasing pattern. In a period of rising prices, this would give rise to a loss, which would be an additional charge against profits, when net monetary assets were positive, and to a gain, which would add to profits, when net monetary assets were negative.

Long-term liabilities were treated differently from short-term liabilities in Gynther's approach. They were regarded as part of the permanent capital of the business, so that changes in their real value would, in effect, be transfers between bondholders and shareholders, which would not affect the total capital of the entity (p.151). Thus, Gynther's strict entity assumption ruled out his adoption of the gearing adjustment, which featured in some later CCA proposals.

A final feature of the book that is worthy of note is its comments on goodwill and intangible assets (pp.129–133). Here, Gynther not only foreshad-

owed his own later paper on the subject (Gynther, 1969), but he also anticipated the approach adopted much later by the UK Accounting Standards Board (1997), which is also currently being considered by the International Accounting Standards Committee. He advocated capitalising purchased goodwill and writing it off only when it was impaired. He opposed compulsory amortisation. His reasoning was that, from his entity oriented view, the accounts should record a reduction in goodwill only when the operating capability of the business was impaired.

Gynther followed his book with a cycle of three papers on accounting for price changes, two in *The Accounting Review* (Gynther, 1967a and 1970) and one in *Accounting and Business Research* (1974). His paper on goodwill (Gynther 1969) was also published in *The Accounting Review*; so the period up to 1974 was the one in which he sought to address academic audiences at the highest level.

The cycle of papers on price change accounting elaborated on the ideas in the 1966 book but did not change them in any fundamental way. The first, on 'Accounting Concepts and Behavioral Hypotheses' (1967a), which built on an earlier paper (1962), explored the different assumptions and reasoning of advocates of both 'proprietary' and 'entity' theories of the firm. It showed considerable knowledge of the relevant literature and made an acknowledgement of social, political and psychological influences on accounting which, for its time, was incisive and anticipated later developments in the accounting literature. However, the conclusion was not novel: the author expressed his enthusiasm for the entity approach, based on his own experience:

'This author votes for the entity theory, and in so doing he admits that his twelve years in industry as an accountant-controller before entering academic life have shaped his frame of reference....' (Gynther, 1967a: 289)

The consequence of this was, of course, his operating capability concept of capital.

The second paper in the cycle, 'Capital Maintenance, Price Changes, and Profit Determination' (1970) elaborated on the alternative capital maintenance concepts and their consequences for profit measurement in price change accounting. It contained (p.720) Gynther's matrix presentation of alternative price change accounting systems, with capital maintenance concepts identified in the rows and asset valuation methods in the columns, which he had previously published in a professional bulletin (Gynther, 1968: 13). There was also, in typical Gynther style, a substantial numerical appendix, enabling the accountant to see the detailed calculations and journal entries underlying the alternative systems. The main conclusion

of the paper was that accounting for price changes is concerned with *long term* profit and that capital maintenance, rather than asset valuation, is fundamental to this process. He demonstrated this assertion by means of a numerical example which showed that errors in asset values ultimately reverse (as they are liquidated) whereas different capital maintenance concepts give rise to permanent differences in measured profit. Unlike most of Gynther's writings, this second paper did not reach a normative conclusion.

The final paper in the sequence (acknowledged as such by the author, Gynther, 1974: 141) was 'Why Use General Purchasing Power?' This focussed on an extensive discussion of the price indices, around the theme that these should be as specific as possible. Those used in accounts should be specific to the needs of the entity, and those used by the shareholder should be specific to the consumption pattern of the individual shareholder. Hence, the author opposed the use of general price level indices in the accounts: the place of a general price level adjustment was in the personal accounts of the proprietor (or shareholder), and the index should be selected according to the needs of the individual. This was, of course, an elaboration of another of Gynther's themes: its genesis owed a great deal to the work of Hendriksen (1961 and 1963), which were cited extensively in Gynther (1966). The paper also contained an interesting appendix (Appendix 2), which elaborated the matrix treatment of asset valuation and capital maintenance, attributing various combinations to various authors. It shows Gynther's 'ideal concept' (i.e., not practical) of capital maintenance as being Net Present Value. This is consistent with his discussion of asset valuation in his 1970 paper and also with his paper on goodwill ('Some "Conceptualizing" on Goodwill', 1969). The latter paper had elaborated the earlier goodwill proposals in Gynther (1966) and made clear that the author preferred the capitalisation and revaluation on a net present value basis (i.e., what would now be known as an 'impairment test') of purchased goodwill but would also, ideally, treat self-generated goodwill on this basis. Thus, his ideal balance sheet would show specific assets at replacement costs, but goodwill at net present value, the total summing to management's estimate of the total net present value of the business. However, Gynther rejected the view that goodwill is simply a residual amount, representing the present value of expected abnormal returns. He took the view that such returns had a source, albeit an intangible one, and that is why it should be amortised only when the source was impaired.

The 1974 paper completed the elaboration of the ideas that Gynther had developed in his 1966 work. Having, in effect, completed his programme

of academic research, he moved in 1977 to the accounting profession. This gave him the opportunity to apply his ideas through his influence on the accounting standard-setting process. He had always sought to make his work practical and accessible to practitioners, through publication in professional journals. One of these publications led to a controversy with Chambers, to which we will return.

His new role as research partner of a leading professional firm enabled Gynther to continue his crusade through publication in professional journals but also gave him greater access to the standard-setting process. He therefore had a considerable influence on the development of a current cost accounting standard in Australia (Tweedie and Whittington, 1984: Chapter 8). Notably, he contributed to the debate on the treatment of monetary items and was a member of the committee that produced the 1978 exposure draft (Australian Accounting Research Foundation, 1978), which proposed specific indexation of the net monetary asset pool, with no adjustment for long-term liabilities. This was almost a replica of Gynther's conclusions in his previous work. Statement of Accounting Practice 1, *Current Cost Accounting* (Australian Society of Accountants, 1983) which was the ultimate outcome of the Australian standard-setting debate, incorporated the monetary working capital adjustment and relegated the gearing adjustment (for long-term debt) 'below the line', as Gynther would have wished.

At this stage (1983), it must have seemed that Reg Gynther's move to the accounting profession had resulted, in practical terms (which is what he would have .valued), in triumph over his old adversary, Ray Chambers, who advocated a very different price change accounting system, Continuously Contemporary Accounting (CoCoA): asset values based on selling prices, combined with a capital maintenance concept of the proprietorship type, based on general index adjustment. However, as we have seen, the triumph was short-lived. The 1983 statement was a recommendation rather than a standard, and it was not widely followed. As inflation rates fell and industry (in the absence of the concessions based on it) rebelled against CCA, this system of accounting failed to take root in Australia or elsewhere (Tweedie and Whittington, 1997).

We now turn to consider the creator of the CoCoA system, Ray Chambers.

4.3. Ray Chambers and Continuously Contemporary Accounting (CoCoA)

As we have already seen, Ray Chambers devoted most of his long career to the academic study of accounting, unlike Russell Mathews, the majority of whose publications was in the public finance

area, or Reg Gynther, who came late to academe from commerce and left early to take a partnership in a professional firm. Thus, in dealing with Ray Chambers' contribution to price change accounting, we are touching on only a small part of his contribution to accounting thought and the academic literature of the subject.

Nevertheless, accounting for price changes was an important aspect of his theory of Continuously Contemporary Accounting (CoCoA), developed in his most important work, *Accounting, Evaluation and Economic Behavior (AEEB)* (1966b). We therefore have to understand the development of CoCoA in order to understand his views on price changes.

Chambers was driven by a desire to develop accounting theory on what he called a scientific basis. By this, he meant that the theory should be logically deduced from clearly stated assumptions – i.e., it should be deductive, as opposed to the inductive approach of his predecessors, such as Littleton (1953), who had observed accounting practice and attempted to rationalise it. In this endeavour, he was inspired by the work of Canning (1929) who had observed the primitive state of accounting theory from the perspective of an economist. This agenda was spelled out in Chambers' 'Blueprint for a Theory of Accounting' (1955a).

The next major development was in *Towards a General Theory of Accounting* (1961), which presented 40 basic assumptions and derived 21 principles from them. With regard to price changes, Chambers stressed the importance of stating the financial position at balance sheet date properly. He therefore advocated the valuation of assets at their current values as measured by replacement prices:[61]

> '*Replacement price* (or replacement cost) does not mean some hypothetical future price to be paid on some hypothetical future replacement date. It means the price currently ruling for equivalent service potential. The price currently ruling for producers' goods is the market's assessment of expected income flows from their use at the present level of prices, for all potential users of such goods.' (Chambers, 1955: 29, para. 90)

Later, he was to modify this view and he conducted a crusade in favour of selling prices rather than replacement costs.

Another feature of the 1961 paper was Chambers' treatment of changes in the general price level. His earlier professional writings had recognised the problem of changes in the general price level affecting the value of the unit of measurement

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[61] He had first advocated replacement cost accounting adjustments much earlier in a brief paper (Chambers, 1949) that might have won the applause of Mathews and Gynther.

(money), as being distinct from the problem of changes in specific replacement prices (e.g., Chambers, 1952b, in which he cited Sweeney, 1936). In his 1961 study, he formalised this in his celebrated notation, which became almost a standard in the literature for expounding alternative models of price change accounting.[62] Starting with a balance sheet, defined as:

$$M + N = L + R \dots \dots \qquad (1)$$

(where M are Monetary Assets, N non-monetary assets, L liabilities and R residual equity),

he multiplied through by the change in the general price level $(1 + p)$ over a period which was otherwise transactionless, to yield (Chambers, 1961: 35):

$$M(1 + p) + N(1 + p) = L(1 + p)$$
$$+ R(1 + p) \dots \dots \qquad (2)$$

And, remembering that the monetary items, M and L, are, by definition, fixed in monetary terms, this led to the conclusion that, if p were positive, there would be a loss on holding money of pM and a gain on borrowing of pL, although at this stage Chambers did not treat such gains and losses as part of profit. This simple statement, which is now so familiar as to seem obvious, was, at the time, a considerable clarification of the issue. It led Chambers to take a proprietary view of capital and to support the use of general purchasing power indices for capital maintenance purposes, an issue that he later clarified through modification of his notation (Chambers, 1967b). This brought him into direct conflict with Russell Mathews, in a heated, published debate which we shall review later. The issue there was the role of general indices and the treatment of monetary items, but Ray Chambers was about to enter a more momentous debate, that relating to valuation, which lasted for the rest of his career.

The valuation issue was clarified, and, in Chambers' view, settled, in *AEEB* (1966b), which developed his 1961 framework into a comprehensive theory of financial accounting, Continuously Contemporary Accounting (CoCoA). The anchor of this system was its valuation principle of *current cash equivalent*, by which Chambers meant realisable values. Thus, he had switched allegiance from buying prices (replacement costs) to selling prices. He modified this in the case of work-in-progress inventories and non-vendible durables (i.e., fixed assets with little or no resale value which were nevertheless assets that were essential to the business) by allowing replacement cost to be used a proxy for current cash equivalents in such cases. When his critics gleefully seized on this as an inconsistency, Chambers, who was fastidious (even relentless) in his application of logic, changed his position to one that he regarded as being totally consistent: if work-in-progress and

non-vendible durables had no sale price, then they would be given a zero value (Chambers, 1970).

Chambers' conversion to selling prices was driven by the logic of his theoretical assumptions. It was foreshadowed in his paper 'Measurement in Accounting', published in 1965 but first drafted in 1963. Two particularly pregnant excerpts from the introduction to this paper are as follows:

'It transpires that the assumption of adaptive behaviour in a changing environment necessitates a set of quantification rules which shall be a measurement system.' (Chambers, 1965d: 32)

and

'This paper takes uncompromisingly the position that accounting is concerned strictly with the past and present, but so that it is always relevant to the future. To mix measurements with expectations is to confuse an already complicated present. To make measurements is the business of the accountant as such; to form expectations is the business of actors.' (p. 33)

These quotations capture the essence of Chambers' thought, although from that essence he generated a complex system. The first quotation indicates that he was concerned with *adaptive behaviour*, and that he wished to develop a measurement system around this objective. His idea of a measurement system would be one that was comprehensive and logically consistent. The second quotation indicates that he was concerned to provide information that was as up-to-date as possible without straying into assumptions or expectations about future actions. In a way, this showed him to be a true accountant, because he was concerned with events that have occurred, rather than ones that might occur; i.e., he wished to report *ex post* rather than *ex ante*. However, because he was concerned with adaptability, he wished to reflect the *current* financial position, and this led him to current values rather than historical cost. He preferred current cash equivalents, based on selling prices, rather than replacement costs, because, in order to adapt, the entity would have to realise its assets as a pre-condition. Thus, selling prices were always potentially relevant. Moreover, they reflected an aspect of the entity's *present* holding of assets, unlike replacement costs, which represented the cost of assets that the firm had not yet acquired, even if it might expect to do so in the future.

AEEB was a remarkable work of scholarship, showing encyclopaedic knowledge, extending far beyond accounting, and it made an ambitious attempt to provide a new, rigorous, framework for accounting, the scope of which is wider than our

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[62] He later reviewed these applications in Chambers (1978b).

present review. The heart of the CoCoA system is developed in four chapters (4. Monetary Calculation, 5. Financial Position, 9. Trading Ventures, and 10. Accounting for Trading Ventures) out of a total of 14. Stripped of all the supporting arguments, these chapters basically advocate a valuation system based on resale prices ('current cash equivalents'), using the arguments from Chambers (1965d), summarised above, and combined with general price level adjustment of proprietors' equity, to allow for changes through time in the value of the monetary unit of measurement, as developed in Chambers (1961) and (1965c). Thus, Chambers supported the broad system adopted earlier by Edwards and Bell (1961), but with the important exception that he deplored Edwards and Bell's acceptance of replacement cost as the method of valuation in their business profit model. He asserted that:

'In relation to adaptive behaviour the relevant price of goods in possession, their opportunity cost, is the present market resale price'. (Chambers, 1966b: 201)

He saw replacement cost as being related to the replacement decision, but that was a matter for future action rather than the measurement of the present financial position (p. 202). Equally, he rejected, for accounting purposes, the use of discounted present values of assets currently held, because these involved expectations about the future, whereas he was concerned with opportunities available in the present:[63]

'Whatever consideration one gives to the long-run, adaptation in a fluid environment cannot be deferred. Adaptation is action here and now.'

and

'The process of determining financial position, the accounting process, can take no cognisance of expectations in respect of the long- or short-runs. Until the manager of a firm discovers its present position, he does not know whether he is able to take a long-run view or must be content with short-run adaptation.' (p. 205)

These strongly expressed views naturally led to considerable controversy on the valuation question, particularly with advocates of the 'value to the business' method (sometimes known as deprival value), such as Baxter (1967), Solomons (1966) and Wright (1966). Value to the business is based on what Chambers would have called 'long-run' considerations, based on the going concern assumption and using discounting methods as one component of the assessment of value. At the heart of the issue was Chambers' refusal to accept that values based on expectations are suitable for inclusion in accounts, and his assertion that current

cash equivalents contained no element of expectation (although cash realisation is a future event).

Chambers answered these critics in his 'Second Thoughts' paper (1970). This was in many respects his definitive statement on CoCoA. We have already seen that, in this paper, (pp. 47–49), he hardened his views on valuation by excluding replacement costs as proxies for the selling prices of work-in-progress and non-vendible durables. He also acknowledged (p. 43) that he had been wrong to use the idea of realisation in his discussion of the relation between inventory values and income: recognition in the CoCoA system depended only on asset prices changing, not on sale of the asset.

Apart from these two concessions, Chambers held his ground with robust arguments, and he continued to do so for the rest of his life. His arguments against 'value to the business' (Chambers 1970: 44–47) are a good illustration of his confrontational debating style. His numerical example (p. 46) shows clearly that he was concerned with the opportunities offered by the *cash* represented by the asset, whereas his opponents were concerned with the opportunities offered by ownership of the asset itself (including discounted present value). Both seem to be legitimate things to be interested in, but when, as a compromise solution, Reg Gynther (1971) later suggested multiple column reporting, he was, as we shall see, roundly criticised, as someone who was, from 'a CoCoA perspective, a heretic. This numerical example is also of interest because of its implicit assumption of capital rationing: in his two 'feasible' cases, case (a) and case (b), it is assumed that an asset with a present value in excess of resale price should be sold and reinvested in a new asset, if the present value of the new asset is higher. If the firm could raise more funds at its cost of capital, it should clearly, in this case, invest in both assets. By assuming that resale prices of existing assets constrain investment opportunities, Chambers was here making an implicit assumption of capital market imperfection which, strangely, also lay behind Russell Mathews' belief that holding gains could not be regarded as part of profit (as revealed in his debate with Swan).

Another contentious issue was that of long-term liabilities, which Chambers (1966b) had insisted should be recorded at face value, rather than at market value, despite the fact that similar bonds held as assets would be recorded at selling prices. He defended this in his 'Second Thoughts' (Chambers, 1970: 158–159) and later in his 'Third

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[63] Barton (2000b) attempts to reconcile the exit and entry value approaches by suggesting that the former is concerned primarily with the short run and the latter with the long run. These extracts from Chambers' work are consistent with this view.

Thoughts' (Chambers 1974b: 132–134), using the argument that long-term liabilities are somehow similar to equity claims:

'The position is perhaps analogous to that of stockholders'. (Chambers, 1970: 50)

Here again, there is a remarkable resemblance to the assumptions of his opponents, such as Mathews (who refused to recognise an inflationary 'gain on borrowing', on similar grounds) and Gynther (whose 'entity' approach precluded 'gains' arising from transfers between long-term debt and equity).

After the 'Second Thoughts', Chambers devoted himself vigorously to the defence of his system against its critics (e.g., Chambers, 1976d, whose title captures his contentious style: 'Continuously Contemporary Accounting: Misunderstandings and Misrepresentations'), in promoting it as a suitable system for adoption by accounting standard-setters (e.g., Chambers, 1980), in gathering relevant empirical evidence (Chambers, 1973), and in demonstrating how the system could be applied in particular aspects of accounting practice (e.g., Chambers, 1983). He remained fiercely critical of the 'value to the business' method, and of many of the efforts of accounting standard setters which, in his view, lacked an adequate conceptual basis (Chambers, 1998). Thus, he devoted the remainder of his career to fulfilling the task he had set in 1966:

'We have not come to the end of the road. In a very real sense, much of the journey lies ahead. Only the broadest questions have been broached, and perhaps not all of those. To the minutiae of everyday transactions, and their treatment in accounting, little attention has been given'. (Chambers, 1966b: 365)

We now turn to consideration of two published interchanges on the issue of accounting for price changes that took place between Ray Chambers and our other two subjects, Russell Mathews and Reg Gynther, respectively.

5. Two interchanges

5.1. Chambers v. Mathews on general price level adjustment

We have already noted that, in 1965, Russell Mathews published a highly critical review of ARS 6, the American research study which advocated general price level adjustment of historical cost accounts (often known as Current Purchasing Power, or CPP Accounting) as the appropriate response to inflation. His central criticism was that *current valuation* is an essential requirement for accounts to meet the requirement of reporting changing prices. The valuation of assets at historical cost, adjusted by subsequent changes in the

general price level was regarded as 'useless': what was required was an adjustment with respect to the *specific* prices of the asset concerned.

Chambers did not disagree with Mathews' analysis up to this stage, although Mathews' idea of a specific price was a *replacement* price, whereas Chambers had just undergone his conversion to the CoCoA method, which used *selling* prices as the basis. Their disagreement arose in relation to the capital maintenance concept: Mathews, in his critique, used his preferred 'entity' concept, based on replacement costs and refused to include gains on borrowing or losses on holding money in the calculation of profit. Thus, he did not recognise general price level adjustments of capital as affecting profit calculation *within* the accounting period: for him, as for the national income accountant, the main purpose of general price level adjustment was to facilitate comparisons *between* accounting periods and was therefore 'of relatively minor significance' (Mathews, 1965a: 137).

From Chambers' perspective, Mathews added insult to injury by borrowing (or, as Chambers was later to describe it, mis-using) Chambers' own notation to support his case. Chambers (1961: 35) had derived from (1) and (2) above the following expression:

$$M + N (1 + p) = L + [R (1 + p)$$
$$+ Lp - Mp] \ldots \qquad (3)$$

This expression groups, in the square brackets, the adjustments for monetary items together with residual equity. Chambers also noted that

$$pN = pR + pL - pM \ldots . \qquad (4)$$

Thus, the 'p' multiples in the square brackets were equivalent to the price adjustment of non-monetary assets. Although, as a piece of algebra, this is identically true, Chambers subsequently considered the exposition to be misleading from an accounting perspective (Chambers, 1965c and 1978b):

'the deceptive simplicity of the assumptions led me into error' (Chambers, 1965c: 244).

There were two key simplifications. First, the grouping of the monetary adjustments (pL and pM) with residual equity, R, is obviously algebraically possible, but it wrongly (from Chambers' proprietary perspective) assumes that the monetary adjustments are made direct to capital rather than appearing as separate gains or losses to be reported in the profit and loss account. Second, the example did not allow for specific price adjustments of the non-monetary assets, N, to give rise to real holding gains and losses on these items: such gains and losses were, from Chambers' perspective, part of the total profit of the period, not simply adjustments to capital.

To Mathews, however, the implications of
Chambers' assumptions were entirely acceptable.
Under his physical capital maintenance concept,
real holding gains or losses on non-monetary as-
sets and gains or losses on monetary items were
excluded from profit, and he quoted Chambers' re-
sult ((4), above) with approval (Mathews, 1965a:
139–140). This use of Chambers' notation enabled
Mathews to claim that his preferred system
(recording only specific price changes) embraced
general price level adjustment. This was true only
in the unusual case in which the specific price
changes were the same as the change in the gener-
al price level, and if it were considered appropriate
to regard gains and losses on monetary items as
adjustments to capital rather than as part of profit.

Chambers (1965c) responded vigorously to
Mathews' use, or mis-use, of his notation. As we
have seen, he realised that he had previously
(Chambers, 1961) failed to recognise the simplify-
ing assumptions underlying his notation, particu-
larly in his derivation of (4), above. He developed
a more general model, in which the specific price
of non-monetary assets, N, changes at a different
rate, r, from that of the general price level, p, and
in which holding gains and losses are separated
from capital adjustments. Thus, (3) above was re-
placed by:

$$M + N(1 + r) = R(1 + p) + N(r - p) - Mp$$
and income included the holding gains:
$$\text{Income} = N(r - p) - Mp$$
(Chambers, 1965c, p.244)[64]

This was consistent with Chambers' proprietary
approach to capital maintenance, combined with
current valuation of assets. It can be contrasted with
Mathews' preferred approach (1965a: 140), which
was:

$$M + N(1 + r) = R + Nr$$

This yielded (in a transactionless period) a zero
measure of income, because holding gains and
losses went directly to capital (through Nr).

Not content with criticising the use of his own
notation, Chambers (1965c) made a searching ex-
amination of the assumptions underlying Mathews'
physical capital maintenance/replacement cost
system, and particularly the effective exclusion
from Mathews' income calculations of gains or
losses due to a change in the purchasing power of
money:

'And are we to suppose that when a firm sells a
   good the money it receives is specialised money
   only fit for doing specialised things?' Chambers,
   1965c: 249)

Inevitably, Chambers' vigorous critique attract-
ed a response from Mathews (1967), who saw the
central point but found it hard to resist being

drawn by Chambers' disputatious style:

'To a large extent the differences between us are
   differences of definition although Chambers also
   charges me with an error of logic....' (Mathews,
   1967: 113)[65]

After restating his own current value assump-
tions, and stating (correctly) that this was not log-
ically incomplete, within its own assumptions,
Mathews came to the central point:

'My chief criticism of the model is concerned with
   its treatment of N (r - p) - Mp as income;
   Chambers would be prepared to distribute Nr, as
   income, except to the extent that a purchasing
   power loss Rp (that is, Np + Mp) has occurred
   on opening residual equity. But although the dis-
   tribution of N (r - p) - Mp (or Nr - Rp) will
   leave the firm with a residual equity that is main-
   tained in terms of general purchasing power, this
   will not, to the extent that Nr exceeds Rp, com-
   mand the same quantity of operating assets N at
   their new prices N (1 + r).' (Mathews, 1967:
   116)

Thus, the essential difference between the two
protagonists was one of *assumption* about the ap-
propriate capital maintenance concept. This might
have been an appropriate note on which to end the
debate, but there was yet another response from
Chambers.

Chambers' response (1967b) offered 'an im-
proved representation' of his notation, as well as
some further criticisms of Mathews' concept of
capital maintenance. With respect to the latter, he
shrewdly pointed out (pp. 215–216) the difference
in perspective of national income accounting (to
which Mathews' approach was well suited) and
business accounting.[66] In the new exposition of his
notation, he introduced currency symbols, with
different symbols representing the value of the
currency unit at different times. This particular in-
novation did not find favour with subsequent au-
thors, such as Parker and Harcourt (1969) and
Barton (1977), who preferred using time sub-
scripts to indicate the point in time at which the

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[64] There is no trading income in this model because, for sim-
plicity, a transactionless period was assumed. M now has L
netted off against it, so that it is equivalent to M-L in the pre-
vious notation.

[65] He goes on to refer to a dispute about the averaging pro-
cedure for price adjustment, which was raised by Chambers
(1965c). This dispute is not discussed here because it was not
central to the differences between them and is essentially con-
cerned with technique rather than principle.

[66] One of the founders of the current cost accounting,
Schmidt (1931), explicitly expressed the argument for a phys-
ical capital maintenance concept in the context of preserving
the productive capability of the nation, although Chambers
seems to have been unaware of this at the time. Schmidt is not
referred to in *AEEB*.

currency unit was dated. They were roundly criticised for their alleged 'abuse' of the notation in Chambers (1978b).

The interchange ended with a very brief 'rejoinder' from Mathews (1968) in which he re-stated his position and defended his physical capital maintenance concept as follows:

'The weakening of the firm's financial position is a fundamental objection, not only to Chambers' system but to any other approach...which defines income in such a way as to allow for the differential effects of general and specific price changes'. (Mathews, 1968: 285)

He did not explain the assumptions that lay behind the view that maintenance of real financial capital, as advocated by Chambers, would lead to a 'weakening of the firm's financial position'. Some of these were aired in his later debate with Swan, which we have already reviewed.

The net outcome of the debate was that both parties clarified their positions, and their fundamental differences of assumption became more obvious. Also, Chambers changed his position on an important issue, capital maintenance (now recognising monetary gains and losses in profits). In later years, he was more inclined to defend his position than change it.

5.2. Chambers v. Gynther on multiple column reporting

In December 1971, Reg Gynther published a paper, 'Accounting for Changing Prices: Some Recent Thinking, Recommendations and Practice', in *The Chartered Accountant in Australia*. The paper drew attention to the recent rises in the rate of inflation in Australia and elsewhere, and illustrated its distortionary effects on conventional historical cost profits. He also reviewed various proposals for dealing with the problem, suggested by academics and by professional bodies. He explained clearly the alternative models that had been suggested, with numerical examples, and he emphasised a theme that ran through his other writings: the importance of the capital maintenance concept in measuring income. His exposition of the capital maintenance issue was, in fact, much clearer than that of either Chambers or Mathews in their interchange described above. He also emphasised the importance of using current asset values rather than historical cost adjusted by a general index (the latter having recently been favoured in pronouncements by professional bodies in the UK, and the US). He concluded by commending the Philips system, explaining the usefulness of a similar system in a company of which he was chairman, and criticising the piecemeal approach to price change adjustment.

In general, Gynther's argument was a clear, live-ly and persuasive exposition of an emerging problem and of alternative solutions to it. For example, although he made clear his own replacement cost preferences, Gynther provided a very fair exposition of Chambers' CoCoA system. He also recognised that different types of information could be relevant to different users, and, rather than insisting on replacement cost as the only method, made the following suggestion:

'The solution could quite easily be the production of multiple column statements in which the results of several of the combinations of (i) net asset valuation methods and (ii) capital maintenance ideas are presented.' (Gynther, 1971: 19)

A brief paper by another academic, Philip Brown (1971), followed Gynther's and supported the usefulness of multiple column reports.

It might have been expected that Ray Chambers would have supported much of what Gynther wrote, especially the emphasis on the misleading nature of historical cost accounts in periods of inflation, the critical importance of current values (rather than indexed historical cost) and the distinction between asset valuation and capital maintenance. However, Chambers (1972a) responded with an all-out attack on Gynther. The issue that particularly provoked Chambers was the brief paragraph, quoted above, which suggested the possibility of multi-column statements. Chambers described this as 'a flanking attack' (p. 4) and asserted that multiple column statements were 'a weak conclusion' which would lead to confusion. He then, in a paragraph significantly prefaced 'I believe', asserted the importance of precisely identifying financial position, with the clear implication that his CoCoA method was the only means of doing this. He went on to describe:

'The result – uncertainty and confusion, to the extent of what has been called "scientific scandal"'. (Chambers, 1972a: 5; footnote omitted)

Chambers then proceeded to outline his own assumptions about accounting, and asserted that the alternative systems, described by Gynther (other than CoCoA), would not meet them. He then launched into an attack on Brown's assertion that multiple column reporting would provide data for empirical research on the usefulness of alternative measures. In doing this, he asserted that:

'One of the most elementary rules of enquiry is to isolate causal factors, and not to mix them up or apply them simultaneously in the course of enquiries made to isolate their several effects.' (Chambers, 1972a: 8)

This statement shows a lack of appreciation of the efforts of econometricians and other social science researchers, who have striven to develop sta-

tistical methods to model situations where several causal factors work simultaneously. Of course, controlled experiments would be a much simpler and more efficient research method, but the real world does not often give such opportunities to social scientists.

Chambers concluded with a section ('Cui Bono?') in which he described calls for investor decision-making as 'a red-herring' and called for an end to 'sterile argument and invention'. In case his displeasure had not been adequately expressed, he concluded by repeating the allegation of 'an intellectual scandal'.

Not surprisingly, Gynther, who was not usually at a loss for words, appeared to be taken aback by this verbal assault and replied briefly in the form of a letter (Gynther, 1972). In this, he deplored Chambers' 'irritating' writing style and 'unreasonable comments' and described the allegation of 'an intellectual scandal' as 'offensive' (p. 42). He explained the essentially didactic objective of his paper (which he had fulfilled admirably) and concluded that 'the "tirades" by Chambers tend to become wearisome to many people' (p. 42).

This ended the exchange between Chambers and Gynther, but the cause was taken up, on Gynther's behalf, by Edward Stamp (Stamp, 1972). With characteristic eloquence and wit, he destroyed Chambers' analogies with locating the position of a ship and the methods of the natural sciences (as a natural science graduate who had served in the Canadian Navy, he was well qualified to comment on both), and made a powerful case that accounting should not be 'one-eyed' (p. 12). The response from Chambers (1972c) was perhaps predictable: a strong defence of CoCoA but little direct response to Stamp's arguments for a multi-dimensional approach.

This debate is perhaps of most interest for the light that it sheds on Ray Chambers' evolving attitudes. In his early debate with Mathews, he had offered considerable insight into Mathews' own thoughts, and he had modified his own. After the publication of his major work in 1966, and even more after his 'Second Thoughts' (1970), he seems to have regarded his system as complete and to have decided to defend it vigorously against all comers. He may also have been disappointed by the sceptical reaction of several commentators on his 1966 book, to whom his 'Second Thoughts' was addressed.

Too much significance should not be read into the gladiatorial style of the debate. This was characteristic of Chambers when defending CoCoA (or indeed any intellectual position), but it did not extend to personal animosity. Outside the debating arena, he had particularly good personal relationships with Russell Mathews and Eddie Stamp, both of whom wrote warmly of their respect for

him in the volume of *Abacus* (dated December 1982) that marked Chambers' retirement. However, the style of the debate may have had adverse consequences for the reception of Chambers' own views both in the accounting profession and in academe.

In the accounting profession, the issue of inflation accounting was becoming very important in the early 1970s, as inflation gathered pace. Academics such as Mathews, Gynther and Chambers were agreed on many issues, and notably on the need for some form of current valuation, as opposed to general indexation of historical costs. The main choice of model lay between CCA (which embodied one version of the former) and CPP (which embodied the latter). Gynther's (1971) liberal proposals would have enabled these academics to take a united front on the need for current values. Instead, Chambers' strong dissent enabled unsympathetic practitioners to argue that 'the academics cannot even agree amongst themselves'. Thus, Chambers' 1972 intervention, and the attitude that it represented, may have resulted in precisely the 'weak' message from academe that he was trying to avoid.

In academe, there was increasing impatience with an apparently sterile debate between 'normative' theorists who insisted that others were wrong merely because they made different assumptions. This mood of impatience was well captured in an influential paper by Carl Nelson (1973), and it was associated with an increased interest in assessing alternative accounting methods empirically through statistical studies, such as stock market impact studies, which had been pioneered by young researchers such as Beaver (1968) and Ball and Brown (1968). Later, Watts and Zimmerman (1979) took this a stage further by reducing the status of 'normative' theorising (as done by Mathews, Gynther and Chambers) to that of providing 'excuses' for people to choose accounting methods which suited their own interests. These developments were probably inevitable, in the light of changing technologies (databases and computing power became more accessible) and the natural tendency of new generations to seek new methods, but the process was possibly encouraged by the confrontational and unconstructive style of debate between such 'normative' theorists.

6. An overview

Mathews, Gynther and Chambers all served to clarify the issues of price change accounting, particularly in the three decades from the early 1950s to the late 1970s, when the subject attained increasing importance on the agendas of practical policy-makers. The subject itself receded in prominence and importance as inflation subsided (Tweedie and Whittington, 1997), but the issue of

price changes remains fundamental to accounting measurement, as do the associated issues raised by price change accounting. Thus, for example, international groups of standard-setters are currently wrestling with the restructuring of the income statement. This raises many issues, such as the appropriate concept of capital maintenance, the criteria for income recognition, and the relationship of the profit and loss account to the balance sheet, which were clarified in the earlier debates. The concept of financial adaptability, on which Chambers laid such stress, has also entered the consideration of accounting standard setters (e.g., Accounting Standards Board 1999: 28). Equally, in academic research, the work of Ohlson (1995) and Feltham and Ohlson (1995) has revived interest in the theoretical relationship between accounting information and stock market valuation, and particularly the implications of the 'biased accounting' to which traditional historical cost accounting often gives rise.

Thus, the work of our trio in price change accounting and accounting theory generally has added to the stock of knowledge. However, their contribution was much wider than this. We have already alluded to Mathews' substantial work in public finance, Chambers' much wider contribution to accounting, and Gynther's professional work. The major contribution of all three was to increase the rigour and status of accounting as an academic discipline. In Mathews' case, this is apparent not only in his research, but also in his textbook, *Accounting for Economists* (1962), which sought to improve the application of economics to accounting and the intelligibility of accounting to economists. In Chambers' case, it was most apparent in *AEEB* (1966), which was a truly remarkable and innovative attempt to derive a comprehensive accounting system from a set of axioms. In Gynther's case, his academic output shows an eloquence, clarity of thought and curiosity which is all the more remarkable, because, unlike the other two, he did not have the advantage of completing an undergraduate degree before he became an academic. In all three cases, the contribution was crowned by founding distinguished academic departments: Mathews in Adelaide and the Australian National University, Gynther in Queensland, and Chambers in Sydney.

In summary, Mathews, Gynther and Chambers, each in his distinctive way, made a lasting contribution to accounting thought and education. They were fortunate in living at a time when there was an obvious need for their contributions, but they seized their opportunities and thus earned their place in accounting history.

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Book reviews

The Early History of Financial Economics, 1478–1776. *Geoffrey Poitras.* Edward Elgar, Cheltenham, UK, 2000. 552pp. £75.

Geoffrey Poitras has written a monumental study of the development of financial economics during the 298 years from 1478 to 1776. The year 1478 was chosen since *Treviso Arithmetic*, the first printed commercial mathematics book was published in that year. The year 1776 was chosen because Adam Smith's *An Inquiry into the Nature and Causes of the Wealth of Nations* was published in that year (it was also the start of the War of Independence but that was not the causal event). Since 1776 could have easily have been the launching of financial economics, it could have been the beginning of the study rather than the end. One would conjecture that Poitras will cover the 200 years after 1776 in his next book.

The basic approach of the book is to 'summarize and synthesize the somewhat disparate histories that from the basis of the early histories of financial economics'. (p. 6)

While this book is a fine example of academic scholarship, it is also an excellent example of academic scholarship's worse faults. Thus Poitras states (p. 2): 'The ghost of Ramist philosophy is found to be haunting the *Wealth of Nations...*' and I am at a loss since I do not know Ramist philosophy and Poitras does not assist the reader. Later on the same page we have '...Considerable modern debate has been given to establishing whether mercantilism proposed a cohesive framework for economic policy.' Again, no reference and no explanation of what aspect of mercantilism is being considered. A sentence or two explaining the aspect of mercantilism being discussed would be helpful for many readers. In fact, a chapter on mercantilism would have been useful especially since Chapter 11 returns to mercantilist interest theories.

Poitras admits to a bias for concentrating on developments in Europe, especially the contributions of English authors. His justification for this strategy is the availability of some written documents regarding European financial economics, 1478–1776 and very few writings originating from other geographical areas.

While Poitras states the study is of the period 1478–1776, pp.22–29 reviews earlier periods. To begin his study of financial economics in 1478, Poitras implicitly equates financial economics with any commercial transaction. Thus the book could have just as well been titled *Commercial*

Transactions 1478–1776. His definition of financial economics is excessively broad. I would have preferred to have had financial economics equated with a subset of commercial transactions that were based on accepted financial theories (e.g. time value of money arithmetic). The definition of financial economics being used allows Poitras to include (Chapter 2) 'History of Commerce and Finance', which describes money markets (bourses and exchanges) as well types of securities and contacts used from the 12th to the 18th centuries. Moneylending (Lombards and Jews being active participants) is discussed in an interesting manner, but little or no financial economics is introduced.

Life annuities are also discussed in Chapter 2 (p.54): 'In the late 17th and early 18th centuries, analytical solutions were proposed to the problem of valuing life annuities.' But Poitras does not share those solutions with us in Chapter 2. He then states that (p.55) 'oddly enough, until the 19th century, market practice usually involved selling life annuities without taking accurate consideration the age of the nominee.' Obviously, the analytical solutions were flawed.

Chapter 3 discusses 'The Scholastic Analyses of Usury and Other Subjects'. Since financial economics is based on competitive markets, a discussion of the evolution of usury issues is not that enlightening relative to financial economics.

Chapter 4 traces the evolution of commercial arithmetic and beginnings of accounting. The chapter's Appendix shows a Table of future value calculations for 0.10 for years 1 through 30, published in 1613 by Richard Witt, and the present value of an annuity for different interest rates published in 1772. Chapter 5 makes clear that compound interest calculations were well known by mathematicians by the early 17th century, and Chapter 6 describes their uses in valuing life annuities.

There is a switch in focus in Chapter 7 to foreign exchange and the bill market and in Chapter 8 to the analysis of joint stock companies (the predecessor of today's corporations). Chapter 8 includes interesting insights on John Law (the Mississippi scheme), the South Sea Bubble, and the Bubble Act of 1720. Poitras tries to relate the investment activities in 18th century joint stock companies to the portfolio theories of Harry Markowitz and William Sharp.

Chapter 9 deals with derivative securities. Poitras shows that elements of the put-call parity was implemented by de la Vega (1688) and de Pinto

(1771).

Chapter 10 is the most interesting chapter for me. Were the Mississippi Scheme, the South Sea Bubble and the Dutch tulipmania of 1634–1637 examples of irrationality, or rather bubbles based on rationality and manipulation or institutional failure? Poitras is even-handed in his evaluation. Most experts on historical bubbles can increase their knowledge by reading this chapter.

Chapter 12 deals with maritime insurance, life insurance and other subjects (e.g. old age pension plans).

Chapter 13 seeks to establish the origins of financial economics. By the middle of the 18th century, 'sophisticated techniques for pursuing contingent claims such as life annuities had been developed and applied to the establishment of life insurance and pension funds' (p. 483). This conflicts with the earlier observations of Chapters 2 and 4 (see above).

Poitras primarily uses secondary sources and he uses them well. Anyone who intends to work on financial issues originating in the period 1478–1776 or wants to know the origin of the financial concepts being widely used today, would do well to start with this book and the sources used and cited by Poitras.

Harold Bierman, Jr.   Cornell University

The Taxation of Stock Market Investments. *Cliff Pratten.* University of Cambridge, Department of Applied Economics, December 2000. 118pp. £15.

This book is a personal plea to the government to reform capital gains tax. The author, who invests directly in shares himself rather than entrusting his money to institutional investors, argues that the current tax system is biased against the private investor in favour of the institutions. In particular, capital gains tax, at an all-time high percentage rate, forces investors to hold stocks for longer periods than they would like and tends to penalise investors in rising markets while not compensating them in falling markets.

The book is topical, restricting its analysis to the boom years of the 1980s and 1990s. Indeed, the author begins the book by asking why share prices were so buoyant in those decades and moves on to the fascinating question, 'How fast will share prices rise in the future?' The analysis is based on a version of the dividend growth model, with alternative dividend and profits growth rates as well as alternative risk premia leading to a wide range of possible future share price growth rates. It is not clear why this is relevant to the main thesis of the text – the taxation of private versus institutional investment – as there is no reason given as to why either type of investor should be better or worse at forecasting these growth rates. From the conclud-

ing paragraphs of the chapter, it would appear that the author is reassuring potential private investors that, although he expects equity returns in the future to be lower than in the 1980s and 1990s, there is unlikely to be a crash in UK equity values in the near term, making long term equity investment still attractive for the private investor.

The next chapter gives a rapid overview of the history of the taxation of savings. I would argue that it is not complete, failing to explain the reason for the removal of ACT relief in 1997, which was due to a bias in favour of dividends to pension funds, rather than as an attack on private investors. However, the author is not attempting an unbiased analysis with such comments as 'Since 1997, the *principles* on which the taxation of company profits is based have been obscure.'

The author then describes alternative investment strategies and the range of institutional investment vehicles available in the UK, namely unit trusts, investment trusts, life insurance policies, pension schemes, and ISAs. He discusses what he calls 'Own Investment' in a separate chapter, and this describes how he would go about putting an equity portfolio together. This is rather an odd chapter, as it fails to discuss how much cash or bonds should be bought, desired risk levels, etc. and adopts the traditional broker approach to risk diversification – equal amounts in each share – completely ignoring the Portfolio Theory or CAPM approaches of optimisation or indexation as preferred investment alternatives.

The most interesting and least partial section of the book consists of chapters on comparing the costs (transaction costs, management charges and taxes) of investing directly as opposed to via each of the types of institutional investment. Here the author makes the valid point that, for basic rate taxpayers, investing via vehicles such as ISAs and life insurance policies, the transaction costs and charges may well exceed the associated tax benefits. These include being able to offset interest costs and expenses against income before taxes, an advantage not available to private investors. The numbers show that investment vehicles designed to encourage saving are biased towards helping high rate taxpayers.

The concluding chapters argue that the structure of capital gains tax and the government encouragement of institutional investment is inefficient in the economic sense, through waste of resources (management charges) and mis-investment (investors trying to minimise capital gains tax liabilities rather than maximise returns). The final sentence of the book is a plea to the government: 'Effective reform of capital taxes would be a positive sum game for Britain'.

The book makes some interesting points (such as the fact that private investors hold 16% of

shares in the UK stock market compared with 44% in the US). It also highlights the waste inherent in making low rate tax payers invest in vehicles which squander the tax advantages offered in management charges. However, the argument against capital gains tax would have been stronger if comparisons with other countries' approaches and concrete suggestions had been made.

Janette Rutterford   The Open University

CALL FOR PAPERS

Special Supplement of Research in Accounting in Emerging Economies

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public sector reform, privatisation, and changing forms of accounting and accountability within emerging economies

Guest Editors: Zahirul Hoque (Griffith University) and Trevor Hopper (University of Manchester)

Many developing and/or previously socialist countries have embarked upon structural adjustment programmes involving public sector reform and market-based economic policies, often at the behest of external agencies such as the World Bank, IMF, and United Nations. Public sector enterprises have become commercial, sometimes corporations, and often privatised. Private sector enterprises, competition, and financial markets have become central to policies based on a transition to market capitalism. As a consequence, accounting has become more important for development. Yet it remains under-researched, despite being crucial for attaining policy objectives. This special issue will act as a forum for contributions from academic researchers and policy-makers in accounting, management, and development studies working in this area and hopefully promote future work and interchange. Relevant topics include:

- Designing and implementing market-based accounting information and control systems in specific socio-economic contexts.
- Accounting and accountability associated with 'new' public sector management.
- The relation of accounting practice to effective corporate and national governance.
- The effect of accounting upon enterprise performance and broader development goals.
- External regulatory issues, including external reporting, auditing and enforcement.
- The role of accounting professional bodies, consultants, the state, education and training bodies, financial institutions and capital markets, and aid agencies upon accounting policy and practice.
- Designing and implementing market-based accounting problems in countries with weak capital markets, family capitalism, and state interventions.
- Theorising accounting change in developing economies in transition to market capitalism.

The focus of the issue will be on policy and political issues rather than technical matters. Contributions from academics in development studies, who have met accounting issues in their research, and policy-makers and practitioners are actively encouraged along with those from accounting and finance academics. Empirical and review papers are sought from a variety of theoretical and methodological perspectives. Emerging economies are defined broadly and may include former communist economies in transition to market-based regimes.

Enquiries and submission of papers should be made to Dr Zahirul Hoque, School of Accounting and Finance, Griffith University, PMB 50, Gold Coast Mail Centre, Queensland 9726, Australia, Tel (617) 555 28703, Fax (617) 555 28068, email z.hoque@mailbox.gu.edu.au. Four copies of manuscripts (normally not exceeding 12,500 words) are required by 1 February 2002. Each paper will be subject to the normal blind review procedures of *Research in Accounting in Emerging Economies*.

Accounting and Business Research

The determinants of audit fees – evidence from the voluntary sector

The management of strategic exchange risk:
evidence from corporate practices

The characteristics of firms subject to adverse rulings
by the Financial Reporting Review Panel

Accounting and Business Research

The Institute of Chartered Accountants in England and Wales

Incorporated by Royal Charter, 11 May 1880

ISSN 0001-4788

Accounting and Business Research

Volume 31   Number 4   Autumn 2001

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Objective of Accounting and Business Research

The objective of *Accounting and Business Research* is the publication of substantial and original contributions to knowledge in the areas of accounting broadly defined. Articles should be empirical or analytical; rigorous, yet preferably intelligible to a wide audience of academics and, where appropriate, practitioners. Presentation should be as elegant and economical as possible, avoiding unnecessary words, numbers or symbols.

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The determinants of audit fees – evidence from the voluntary sector

Vivien Beattie, Alan Goodacre, Ken Pratt and Joanna Stevenson*

Abstract — Given the growing demand for accountability in the public sector, there is a need to begin to investigate audit pricing issues in this sector. This study makes three contributions. First, it develops and estimates, for the first time, a model of audit fee determinants for the charity sector. As in previous private sector company studies, size, organisational complexity and audit firm location are the major determinants. A positive association between audit fees and fees for non-audit services is also observed. Charity sector factors of empirical significance include the nature of the charity (i.e., grant-making or fund-raising), its area of activity and the importance of trading income. Separate models for grant-making and fund-raising charities reflect the relative complexity of the audit of fund-raising charities. Second, the lower auditor concentration in the charity sector market, compared to the private sector market, permits a more powerful test of whether large firms and/or auditor expertise are rewarded with a fee premium. In the more complex audit environment of fund-raising charities, the results show that Big Six audit firms receive higher audit fees (18.5%, on average) than non-Big Six firms. Also, non-Big Six audit firms with charity expertise are rewarded with a fee premium over other non-Big Six firms. Finally, the study demonstrates that the charity audit fee rate is significantly lower than that of private sector companies; in fact it is approximately half. A change in the reporting of charity audit fees is proposed to reflect any element of 'charitable giving' by the audit firm. **Keywords:** audit fees; auditor expertise; charity sector; fee premium; non-audit services.

1. Introduction

The market for audit services is recognised to be segmented into distinct sub-markets. To date, research has focused on the private sector market (which itself comprises distinct sub-markets). The principal issues that have been investigated are market structure (including the related issues of market concentration, auditor selection and auditor change) and audit pricing. Early audit pricing studies were motivated by concerns that the top tier audit firms (then the Big Eight) were earning excess economic rents due to the existence of an oligopolistic market structure. Later studies, conducted in a more competitive auditing environment, were motivated by concerns regarding low-balling, and the potential resultant weakening of auditor independence and reduction in audit quality. Most recently, attention has shifted to examine the impact of auditor industry specialisation (i.e., expertise) on audit fees (for example, Pearson and Trompeter, 1994; Craswell, Francis and Taylor, 1995; Cullinan, 1998); results to date have been contradictory.

In addition to the extensive literature on audit pricing in the private sector, there are also a few studies that investigate sub-markets within the public sector (e.g., Baber, 1983; Baber, Brooks and Ricks, 1987). The objective of these studies is to establish the generalisability of findings regarding audit fee determinants from the private sector to other audit markets, and also to identify additional factors reflecting the unique aspects of the accounting and auditing environment in the public sector. Moreover, the demand for accountability in this sector is increasing and so audit pricing studies of sub-markets within the sector are of importance in their own right. To our knowledge, however, no study has investigated audit pricing in the voluntary sector.

The voluntary sector is seen to be the 'major third force (in addition to the private and public sectors) in society without which much social provision would seize up' (SCVO 1997:4). In many countries, political and fiscal constraints on the welfare state are resulting in an increased flow of public resources into the sector, with local government contracting with the sector to provide services. The charity sector is the most significant component of the voluntary sector.[1] Approximately

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[1] There are considerable difficulties associated with defining the charity sector and measuring its size. Narrow operational definitions exclude museums, universities, private colleges and schools, local enterprise companies, hospital trusts, housing associations, friendly societies, trade unions, and places of worship, because they are insufficiently oriented towards the public benefit, are not sufficiently independent, or information is not readily available.

4% of the paid UK labour force is estimated to be employed in this sector, with registered charities in England and Wales having an income of £16bn in 1996 (Pianca and Blackwood, 1996:1). This represents approximately 3–4% of gross domestic product (GDP) (Wise, 1995:3). There are approximately 187,000 registered charities in England and Wales alone (Pharoah and Smerdon, 1998).[2]

Currently, public confidence in this sector is low, due to a number of highly publicised scandals and frauds and poor quality reporting (*Accountancy Age*, 1998; *The Herald*, 1999). There is clearly a need to demonstrate greater accountability if this sector is to achieve its full potential (NCVO, 1998). Moreover, accountability must be especially rigorous in this sector due to the weakness of the 'customer' (i.e., beneficiary). The recent creation of unofficial independent monitoring bodies, such as The Accreditation Bureau for Fundraising Organisations, seeks to restore the public's trust (*Accountancy Age*, 1998). The independent audit is a key means of providing accountability, but the requirement for an external audit depends on the exact nature of the charity and its location. Incorporated charities whose annual gross income is above £250,000, or whose balance sheet total exceeds £1.4m, are subject to a full statutory audit under the Companies Act 1985.

Unincorporated charities in England and Wales also require an audit if annual income or expenditure exceeds £250,000 (Charities Act 1993) but in Scotland the threshold is £100,000 (Law Reform Act 1990). Charities falling below these thresholds may nevertheless have provisions in their governing documents that require an independent audit. Generally, smaller charities may be required to undergo an independent examination of their financial statements or to appoint a reporting accountant.

Auditors of charities must comply with the Auditing Practices Board's Auditing Standards and take into account the additional considerations contained in the 1996 Practice Note 'The Audit of Charities' (APB, 1996). Rules on the appointment and remuneration of auditors are contained in the relevant legislation (e.g., The Companies Acts, the Charities Act 1993). However, for non-incorporated charities there are no members to ratify audit appointments and there is no formal requirement for an annual general meeting as a forum for appointment, so the choice of auditor is effectively left to trustees. Audit reports are normally addressed to the trustees or directors (if incorporated), although the charity's governing document or specific legislation may identify another or other

parties to whom the auditor should report. For example, the British Museum is audited by the National Audit Office which reports to the Houses of Parliament, under the Museums and Galleries Act 1992, since the museum is predominantly funded by the government. Additionally, there is a general statutory duty under the 1993 Act (for England and Wales) for auditors to report certain matters such as misconduct or mismanagement by trustees directly to the Charities Commission, which is the regulatory body. In Scotland, auditors have a right (not a duty) to report such matters to the Lord Advocate. Oddly, charitable companies are not subject to this reporting duty under current Companies Act provisions.

All charities in the UK should adopt the accounting requirements of The Statement of Recommended Practice (SORP) Accounting by Charities, issued in 1995 by the Charities Commission. This is supplementary to the accounting requirements of the Companies Act 1985, Charities Act 1993 and Financial Reporting Standards. The SORP was issued in recognition of the need to improve the quality of charity reporting. The key feature of the SORP is the requirement for a Statement of Financial Activities (SOFA) in lieu of an Income and Expenditure Account, though the latter may still be required under legislation such as the Companies Act. The SOFA shows all incoming resources (capital and revenue), direct charitable expenditure separate from other expenditure such as fundraising and administration costs, and a reconciliation of movements in the charity's separately identified funds for the year.

Auditors in the charity sector must therefore familiarise themselves with the SORP requirements as well as the legislation and regulations particular to the constitution of their client charity, its governing documents and the additional auditing considerations outlined in the APB Practice Note. All of our sample charities fell within the audit thresholds and were subject to the SORP requirement to disclose audit fees in addition to fees 'for other financial services such as taxation advice, consultancy, financial advice and accountancy' (SORP, para. 162, p.37).

Audit market structure in the charity sector differs substantially from that found in the private sector. In the UK, the private sector exhibits a high and rising level of supplier concentration. Panel B of Table 1 (extracted from Pong, 1999: 461) shows that, in 1995, the Big Six audited 75% of UK listed companies and accounted for a market share of 92% based on audit fees. The equivalent figures for the charity sector (Panel A in Table 1 taken from Barings (1998)) show that the Big Six audited just 25% in number of the top 2,620 charities and accounted for a market share of 26% based on audit

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[2] One need only look to North American economies to see the potential for growth in this sector. In Canada, for example, expenditure by registered charities represented 12% of GDP in 1993 (Bryden, 1996; Sharpe, 1994).

Table 1
Comparison of auditor market shares in the charity and listed company markets in the UK

Panel A: UK charities in 1997 (n=2620) [1]

Audit firm	No clients audited	Market share %	Rank	Total audit fees (£m)	Market share %	Rank
KPMG	167	6.4	1	1.32	6.4	3
Coopers & Lybrand	158	6.0	2	1.51	7.3	2
Deloitte & Touche	115	4.4	3	1.19	5.7	4
Ernst & Young	107	4.1	4	0.66	3.2	7
Binder Hamlyn	105	4.0	5	1.54	7.4	1
Price Waterhouse	95	3.6	6	0.78	3.8	5
Grant Thornton	68	2.6	7	0.58	2.8	8
Horwath Clark Whitehill	68	2.6	7	0.31	1.5	14
BDO Stoy Hayward	60	2.3	9	0.50	2.4	9
Kidsons Impey	58	2.2	10	0.39	1.9	12
Pannell Kerr Forster	57	2.2	11	0.40	1.9	10
Neville Russell	55	2.1	12	0.34	1.6	13
Buzzacott	50	1.9	13	0.40	1.9	10
National Audit Office	39	1.5	14	0.67	3.2	6
Arthur Andersen	4	0.2	na	na	na	na
Total[2]	2620	100.0		20.70	100.0	
Market share of top 4 ranked		20.9			22.6	
Market share of top 6 ranked		28.5			33.8	
Market share of BIG SIX		24.7			26.4	
Total number of audit firms[3]			620			

Panel B: UK listed companies in 1995 (n=1401) [4]

Audit firm	No clients Market share %	Rank	Audit fees Market share %	Rank
KPMG	20.2	1	22.2	2
Coopers & Lybrand	15.4	2	23.3	1
Price Waterhouse	12.5	3	15.7	4
Ernst & Young	11.6	4	18.1	3
Touche Ross	9.2	5	7.0	5
Arthur Andersen	6.0	6	5.5	6
Binder Hamlyn	3.8	7	1.6	7
BDO Stoy Hayward	3.4	8	0.7	10
Grant Thornton	3.1	9	0.8	9
Pannell Kerr Forster	1.7	10	0.8	8
Market share of top 4 ranked	59.7		79.4	
Market share of top 6 ranked [i.e., market share of BIG SIX]	74.9		91.9	
Total number of audit firms		106		

Notes
1. Data obtained from pages 1.30 and 1.31 of Barings (1998).
2. Total audit fees are estimated from the data on page 1.30 of Barings (1998).
3. Obtained by counting no of separate audit firms on pages 8.3–8.36 of Barings (1998).
4. Extract from Table 3 on page 461 of Pong (1999).
5. Table includes the top 9 audit firms, based on either measure of market share, plus Arthur Andersen.

fees. Moreover, the composition of the top six charity auditors differs from the Big Six. Binder Hamlyn, a 'second tier' firm, audits 105 charities, ranking fifth and emerges as the market leader based on audit fees. Further, the National Audit Office also features in the top tier of charity auditors, ranking sixth based on audit fees but based on a smaller number of audits. The 'outlier' of the Big Six is Arthur Andersen, who apparently undertook just four charity audits (Barings, 1998: 8.3).[3] These differences in market structure provide a unique setting within which to examine the links between market structure and pricing (an aspect of market conduct) that have concerned previous researchers.

The different audit risks and audit market structure mean that the charity sector is a valuable setting within which to develop and test audit pricing models, thereby extending our understanding of pricing issues generally. Moreover, the growing importance of this sector in economies worldwide, and the need for a high level of accountability, mean that an understanding of audit fee determinants in this sector is important in its own right. The present study has four objectives. First, to develop and estimate a model of charity audit fee determinants. Second, to assess the existence of a Big Six brand name premium in a market in which none of the Big Six firms is considered a specialist. Third, to test the pricing impact of expertise in a niche market where the Big Six firms have less dominance than is commonly encountered. Fourth, to undertake an explicit comparison of the level of charity audit fees with those prevailing in the private sector. While the latter does not contribute directly to our general understanding of audit pricing, it will provide preliminary evidence to form the basis of further research on audit risks in the charity sector.

The remainder of this paper is structured as follows. Section 2 reviews the prior literature on audit pricing, covering first the private sector and then the limited number of studies on the public sector. Studies that specifically examine the impact of expertise, in the form of market share, are also reviewed. Methods are described in Section 3, including a discussion of audit risks in the charity sector, model specification and the procedures for the comparison of audit fee levels at the sectoral level. Section 4 deals with sample selection, followed by the presentation and discussion of results in Section 5. A final section summarises and concludes.

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[3] However, in 1994, Arthur Andersen and Binder Hamlyn effectively merged when the four major UK offices of Binder Hamlyn were taken under the Arthur Andersen umbrella.

2. Prior literature
There exists a well-developed literature on the determinants of audit fees in the private sector, dating from the seminal article by Simunic (1980). Three principal lines of research have emerged, which focus on the presence of a Big Eight fee premium, the presence of low-balling, and the impact of non-audit services (NAS) provision. The main objective of Simunic's study was to investigate the impact of the audit firm size variable, after controlling for cross-sectional differences in auditee characteristics. At this time, rising concentration ratios within the market had led to concerns that the Big Eight were behaving monopolistically, i.e., the audit industry was not competitive. In the market of the late 1980s, however, the concern was that audit firms were 'low-balling', i.e., quoting fees below cost to secure clients. Thus, this line of research focused on initial audit engagements. The third main line of research focused on the impact on audit fees of the provision of NAS by the incumbent auditor, amid concerns that such provision impaired auditor independence.

Simunic (1980) develops a pricing model in which the audit fee is determined by differences in loss exposure, differences in the assessed loss-sharing ratio, differences in auditor production functions, and auditor identity. He notes that the observation of a Big Eight premium, while consistent with the extraction of monopoly rents, is also consistent with the existence of product differentiation accruing to high reputation. Moreover, the potential existence of economies of scale would offset both of these factors (Simunic, 1980: 170).

Loss exposure is proxied using auditee size (total assets), complexity (number of consolidated subsidiaries, number of industries engaged in, and proportion of foreign assets), and risky asset types (proportion of debtors and proportion of stock). The loss-sharing ratio is proxied by the accounting rate of return, the existence of a net loss in the two prior years, and the presence of a 'subject to' qualification in the current year. Differences in auditor production functions are captured by an audit tenure variable.

Simunic finds that auditee size is the most important determinant of audit fees. Only the accounting rate of return and tenure variables were not significant in the regression equation, and the overall explanatory power was 46%. The key variable of interest, a Big Eight dummy variable, was insignificant. Thus, the hypothesis that price competition prevails could not be rejected. Moreover, the negative sign on the coefficient suggested that the Big Eight enjoy economies of scale, which are passed on as lower fees to auditees (Simunic, 1980: 187–188).

In subsequent studies, the main control variables in Simunic's model have consistently been found

to be significant. The basic specification of the audit fee model has remained essentially unchanged over the last 20 years, although one or two new explanatory variables have been added.[4] The explanatory power of the model has generally been in the region of 70%. The model has been estimated using many different data sets, drawn from several countries and time periods, in an attempt to assess the generalisability of extant findings and, in some cases, to resolve conflicting findings regarding the audit fee premium variable.

Studies that focus on the existence of a Big Eight (more recently, Big Six) fee premium include Simunic (1980), Simon (1985), Palmrose (1986a), Francis and Simon (1987), Beatty (1993), and Gist and Michaels (1995) in the US; Taylor and Baker (1981), Taffler and Ramalinggam (1982), Chan, Ezzamel and Gwilliam (1993), Brinn, Peel and Roberts (1994), Pong and Whittington (1994), and Che-Ahmad and Houghton (1996) in the UK; Francis (1984) and Francis and Stokes (1986) in Australia; Firth (1985) and Johnson, Walker and Westergaard (1995) in New Zealand; Chung and Lindsay (1988) and Anderson and Zéghal (1994) in Canada; Low, Tan and Koh (1990) in Singapore; Lee (1996) and Gul (1999) in Hong Kong; Simon, Teo and Trompeter (1992) in Hong Kong, Malaysia and Singapore; Simon, Ramanan and Dugar (1986) in India; and Langendijk (1997) in the Netherlands.

Results, while inconclusive, are suggestive of the existence of a fee premium in the case of small auditees, but not large auditees (e.g., Palmrose, 1986a; Francis and Simon, 1987; Taffler and Ramalinggam, 1982; and Francis and Stokes, 1986). This premium is generally attributed to the existence of differentiated audit services, consistent with the predictions of DeAngelo (1981a).

Studies that focus on the existence of low-balling are of two types: those that focus on real markets and those that use data generated from artificial markets. Studies using real market data include Simon and Francis (1988), Turpen (1990), Ettredge and Greenberg (1990) in the US; Gregory and Collier (1996) in the UK; Butterworth and

Houghton (1995) and Craswell and Francis (1999) in Australia. DeAngelo's (1981b) model predicts that low-balling will occur. Because audit cost functions are unobservable, fee cutting on initial engagements is used as a proxy for fees cut below the cost of conducting the audit. This may result in model mis-specification. A significant fee reduction in the initial engagement year is observed in both the US and the UK (Simon and Francis, 1988: -24%; Turpen, 1990: -19%; Ettredge and Greenberg, 1990: -25%; Gregory and Collier, 1996: -22%). However, this is not found in Australia.[5]

Studies that use artificial markets include Schatzberg (1990, 1994) and Schatzberg and Sevcik (1994). Schatzberg (1990) finds evidence consistent with DeAngelo's (1981b) prediction that low-balling will occur when transactions costs are positive. Schatzberg (1994) and Schatzberg and Sevcik (1994) extend this work to examine the relationship between low-balling (price) and auditor independence (quality) and find evidence that transactions costs are not a *necessary* condition for low-balling to occur. An alternative rationale is the existence of cross-sectional variation in audit cost and quality and an informational advantage that accrues to an incumbent auditor-client pair regarding future variations in these audit dimensions.

The impact of NAS provision has been the focus of several studies including Simunic (1984), Palmrose (1986b), Parkash and Venable (1993) and Davis, Ricchiute and Trompeter (1993) in the US; Ezzamel, Gwilliam and Holland (1996, 1997) in the UK; Barkess and Simnett (1994) in Australia; and Firth (1997) in Norway. These studies generally show a positive relation between audit and non-audit fees,[6] which is interpreted by some authors as due to knowledge spillover effects and/or audit production efficiencies and a price-elastic demand for audit services. While other authors dispute this interpretation, a satisfactory alternative has yet to be proposed. Further, using production function data that allows them to control for audit effort, Davis et al. (1993) do not find a significant relation, suggesting that the link is not due to a pricing premium. Parkash and Venable (1993) distinguish between recurring and non-recurring NAS, arguing that only recurring NAS are likely to result in a reduction in perceived auditor independence. They find that auditees purchase higher levels of recurring NAS when they engage industry specialists, which suggests that the selection of an industry specialist is a quality signal that permits the auditee to purchase higher levels of recurring NAS than would otherwise be the case.

Organisational differences can result in differences with respect to factors that determine the supply and demand, and thus the fees, for audit services. A number of studies have examined the determinants of audit fees in the context of the

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[4] Gist (1992, 1994) examines the auditee's regulatory complexity and finds proxies for this factor to be significant and explicable in terms of scale economies and specialisation effects. Iyer and Iyer (1996) examine the impact of the Big Eight mergers on fees and find none.

[5] Craswell and Francis (1999) conclude, following Dye's (1991) analytical work, that the public disclosure of audit fees in Australia precludes initial engagement discounting such as observed in the US. However, this conclusion is not consistent with the UK evidence of Gregory and Collier (1996) who report a significant discount in a setting where audit fees are disclosed.

[6] There is some evidence that this general finding is contingent upon the *type* of NAS supplied and confined to corporate finance and tax services rather than consultancy services (Ezzamel et al., 1997).

public sector (Baber, 1983; Beck and Barefield, 1986; Baber, Brooks, and Ricks, 1987; Rubin, 1988; Ward, Elder, and Kattelus, 1994; Sanders, Allen and Korte, 1995; Deis and Giroux, 1996; and Bandyopadhyay and Kao, 1998).[7] These studies are all conducted in North American settings, most frequently the municipal audit market. It is found that, in addition to the determinants of audit fees in the private sector, additional variables that reflect the unique aspects of the public sector environment have significant explanatory power (e.g., political factors).

Finally, a recent development in the literature is a focus on the impact of auditor expertise and specialisation. Some studies have found that auditors with a specialism in a particular sector receive an audit premium, but others have found that such auditors charge lower audit fees. In an early US study, Palmrose (1986a) found no evidence of an 'industry specialism' premium. Using a large sample of Australian listed companies, Craswell, Francis and Taylor (1995) attempt to disentangle the two components of the Big Eight fee premium: the general brand name premium and the industry specialisation premium. Three levels of audit quality are posited and supported by their evidence: at the highest level specialist Big Eight firms, then non-specialist Big Eight firms, then non-Big Eight firms. Matthews, Jubb and Houghton (1997) extend this work to investigate the structure in the market for audit services in Australia based on the traditional Big Six/non-Big Six dichotomy and a specialisation definition of 20% of state industry audit fee market share, i.e., a four-sector system. Their audit pricing evidence suggests that these four sectors collapse into two levels of audit quality. The higher level includes specialist Big Six, non-specialist Big Six and specialist non-Big Six, while the lower level comprises non-specialist non-Big Six audit firms.[8]

Using fee data from listed Hong Kong compa-

nies, DeFond, Francis and Wong (2000) find evidence of Big Six premia both for general brand name and for industry specialisation. Interestingly, however, they find that a specialist non-Big Six firm in one sector *discounts* fees relative to other audit firms. They conclude that Big Six brand name reputation is a necessary foundation on which to extract a fee premium based on industry specialisation.

Researchers have also investigated other audit markets that are less dominated by the Big Six. Cullinan (1997, 1998) examined the effect of industry expertise on audit fees in the US multi-employer pension plan market, a market in which the Big Six firms have a relatively small market share. Results indicated that non-Big Six firms with industry expertise received a fee premium over non-specialist firms, whereas Big Six firms with larger market shares did not. This suggests that non-Big Six firms may be able to benefit from market specialism in niche assurance service markets. Earlier, Ward et al. (1994) had found that an 'auditor experience' variable was positively associated with audit fees in their study of US municipalities. The study on school district audits in Texas by Deis and Giroux (1996) found that auditors with greater market share charged lower audit fees, as did Pearson and Trompeter (1994) in their study of the US insurance company audit market. Thus, overall, the evidence for an 'expertise' audit fee premium is somewhat mixed.

3. Methods
3.1. Audit risks in the charity sector
Before describing the audit fee model adopted in the current study, it is necessary to discuss the nature and extent of audit risks in the charity sector since these differ somewhat from those encountered in the private sector.

By law, charity trustees have similar responsibilities to company directors (i.e. safeguarding assets, annual reporting, compliance with relevant legislation and other regulations, and the prevention and detection of fraud and error in their financial statements by means of internal control systems). Auditors' responsibilities are laid down in statute, the main legislation being the Companies Acts 1985 and 1989, Charities Acts 1992 and 1993, and The Charities (Accounts and Reports) Regulations 1995, and in professional auditing standards issued by the Auditing Practices Board. Litigation against auditors in the private sector has become a major concern for practising firms in recent years, evidenced by the 1997 £53m out-of-court settlement paid by BDO Binder Hamlyn to ADT, a third party plaintiff. The decision in the ADT case (*ADT Ltd v BDO Binder Hamlyn* [December 1995], unreported), that an auditor may owe a duty of care to a third party if he makes statements regarding the

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[7] While this paper was under review, we became aware of a working paper by Clatworthy, Mellett and Peel (2000) that examines audit fees in UK NHS trusts. This is a market in which auditors are appointed by the Audit Commission and private sector auditors are in the minority. Their model explains 47% of observed fee variation. Unusually, they find a significant negative relationship between audit and NAS fees, supporting the 'knowledge spillover' hypothesis. No evidence is found of a Big Six auditor premium. They also report that the ratio of auditor fees to turnover is less than half that for private healthcare companies. This finding is attributed to differences in audit risk, supply-side factors such as labour cost differentials and/or demand-side factors, such as the existence of a dominant purchaser and regulator.

[8] Ritson, Jubb and Houghton (1997) develop a continuous measure of the extent of change in industry specialisation and find this variable to be significant in a model of auditor change. Specialisation is measured as the percentage of *total* revenues earned by the auditor from the auditee's industry (Ritson et al., 1997:10), a measure that avoids the use of a subjective cut-off rule.

audited accounts to that party, caused audit firms considerable anxiety. It seemed to go against the landmark Caparo decision of 1990 (*Caparo Industries plc v Dickman and Others* [1990], 1 All ER 568) which limited the auditor's duty of care to shareholders as a body (i.e. not to individual shareholders/investors, and certainly not to third parties).

Case law suggests therefore that, provided the auditor does not actually assume a duty of care to a third party relying on audited financial statements, his duty of care is restricted to those with whom he has contracted to carry out the audit. According to the Caparo decision, in order for an individual to take legal action against an auditor, there must firstly be proximity. In the charity sector there is no body of shareholders and therefore no obvious party to sue an auditor for negligent work. Gordon, Greenlee and Nitterhouse (1999), in their useful overview of the regulation of US charities, similarly affirm that, under US legislation, 'individual donors have no standing to bring suit against charitable organisations in court'. A review of UK case law (Sweet & Maxwell's *Current Law Cases Database*, 1986 to date) failed to reveal any cases involving auditors of charities being sued; the vast majority of the cases dealt with issues such as charitable status, property and tax law. These observations suggest that litigation loss may not be a key factor in charity audit risk, though it is possible that the courts might be prepared to extend the duty of care in the case of voluntary/public sector bodies. However, 'reputational loss' may be an important consideration in auditors' overall risk assessment.

The external audit of charities also presents risks that are peculiar to the sector. The Auditing Practices Board (APB) issued a Practice Note (Practice Note 11, October 1996) in which they identify five inherent risk factors requiring particular consideration by auditors of charity accounts. First, the extent and complexity of regulation affecting the voluntary sector is high, which increases the risk that either trustees or directors may unintentionally breach regulation. Tax rules are especially complex in this area as can be witnessed by the extent of case law arising in recent years. Second, the significance of donations and cash receipts presents problems for the auditor in terms of vouching completeness of income and controls over cash handling. Third, the uncertainty of future income, whether the source is voluntary or grant-based, creates difficulties for the auditor in assessing going concern status. Fourth, the fact that many charities rely on voluntary workers, fundraising on the charities' behalf from widespread branches and retail outlets, is a significant risk factor. These volunteers are not controlled by the reporting entity in the way that employees are, and

their skills, competence and integrity cannot be readily judged. Finally, the auditor must pay attention to the charity's governing documents to ensure that it is operating according to its objects, that its trustees are complying with their designated authority, and that its financial activities are compatible with any restrictions laid down in those documents.

3.2. Charity audit fee model

The first objective in the present study is to develop and estimate a model of charity audit fee determinants. In common with previous studies, our approach is to seek to explain the cross-sectional variation of audit fees using an OLS regression model. Much of the logic of previous work on private sector companies is relevant in deriving our model but it is also necessary to consider additional potential explanatory variables to capture the unique aspects of charities. For ease of exposition, the variables used in the basic charity audit fee model are classified into five mutually non-exclusive categories: auditee size, auditee complexity, audit production costs, non-audit services and audit difficulties and, thus, the general model specification can be summarised as:

audit fee = f (auditee size, auditee complexity, audit production costs, non-audit services, audit difficulties)

Table 2 (Panel A) provides a full listing of the specific proxy variables used, their definitions, variable names, the expected coefficient signs and the sources of the data.

3.2.1. Auditee size

A financial audit involves the review of the accounting and internal control system and of the financial transactions of the organisation. Larger organisations will usually undertake more transactions and have larger balance sheet assets and liabilities, thereby requiring more audit work. Thus, it is expected that larger charities will generally be associated with larger audit fees. In private sector studies, auditee size has often been proxied by company total assets (e.g., Taylor and Baker, 1981; Brinn et al., 1994; Firth, 1997) and occasionally by total sales (e.g., Haskins and Williams, 1988; Chan et al., 1993). In public sector studies of local government audits, population has been used as the size proxy (e.g., Rubin, 1988; Baber et al., 1987).

The measurement of size in the charity sector is not straightforward. First, most charities are by nature service-providers so the link between output and assets is not well defined. This link is further obscured once the difference between the two major types of charity is considered. Grant-making charities tend to have relatively high asset levels, but these are often investments of various types

Table 2
Definitions of independent variables

Description of potential audit fee determinant	Data[1] source	Variable name	Expected sign
Panel A: Basic model variables			
Auditee size			
Total incoming resources (£000) [natural log]	R&A	lntotir	+
Total assets (£000) [natural log]	R&A	lnasset	+
Total funds (£000) Sum of restricted and unrestricted funds [natural log]	R&A	lntotf	+
Auditee complexity			
Number of trading subsidiaries	R&A or B	subs	+
Number of different significant areas of activity [i.e. no of areas with >25% of expenditure] [integer from 1 to 4]	B	divers	+
Number of trading outlets	R&A or B	outlets	+
Number of branches	R&A or B	branch	+
Debtors [total debtors / total assets]	R&A	deb	+
Stock [stock / total assets]	R&A	stock	+
Grant-making or fund-raising [= 1 for Fund-raising]	B	type	+
Constitution [= 1 if Trust]	R&A or B	constT	+ or −
Constitution [= 1 if Act of Parliament or Royal Charter] [base case is Company, when both constT and constA = 0]	R&A or B	constA	+ or −
Principal areas of activity [for sectors with at least 20 sample charities]			
Culture, sport and recreation [= 1 if at least 50% of expenditure in area]	B	CSR	+ or −
Education, training and scientific research	B	ETR	+ or −
Health and medicine	B	HM	+ or −
Social services and relief [base case is charities in less common areas]	B	SS	+ or −
Overseas activities [= 1 if evidence of o/seas activities in fin statements]	R&A	oseas	+
Trading activity – proportion of income from trading [gross trading income / total incoming resources]	R&A	trad%	+
Fund-raising activity – proportion of income from fund-raising [fund-raising income / total incoming resources]	R&A	fundr%	+
Number of trustees (or equivalent)	R&A	trust	+ or −

Notes
1. B = data sourced from Barings (1998); R&A = data sourced from charity Report and Accounts.

Table 2 (*continued*)
Definitions of independent variables

Description of potential audit fee determinant	Data[1] source	Variable name	Expected sign
Audit production costs			
Location of audit firm [= 1 for London]	R&A	audloc	+
Busy season audit [= 1 if year-end in Dec/Jan/Mar/Apr]	R&A	ye	+
Non-audit services			
Fees to auditor for non-audit services (£000)	R&A	nasfee	+ or –
Audit difficulties			
Lag (days) between year-end and date of audit report [mean audit delay used for 21 charities with undated audit reports]	R&A	delay	+ or –
Qualified (i.e. non-standard) audit opinion [= 1 if qualified]	R&A	opinion	+
Panel B: Experimental variables			
Auditor premium			
Big Six /Non-Big Six [= 1 if Big Six]	R&A	BIG6	+ (if premium)
Individual firm dummies for Big Six auditors [KPMG, CL, DT, EY, PW; Arthur Andersen had 0 sample audits] [= 1 if charity is audit client of firm]			+ or –
Market share/specialist			
total number of audit clients in charity sector	B	specialist	+ (if premium)
Individual firm dummies for non-Big Six market leaders [= 1 if charity is audit client of firm]			
Binder Hamlyn	R&A	BH	+ or –
Grant Thornton	R&A	GT	+ or –
Horwath Clark Whitehill	R&A	HCW	+ or –
BDO Stoy Hayward	R&A	BDO	+ or –
National Audit Office	R&A	NAO	+ or –

Notes
1. B = data sourced from Barings (1998); R&A = data sourced from charity Report and Accounts.

and, therefore, are reasonably straightforward to audit. By contrast, fund-raising charities have relatively few assets but there are significant control difficulties associated with funds raised. Given the problem of using assets as the size measure, we use *total incoming resources* (the closest charity equivalent to company sales), while also recognising the major difference between grant-making and fund-raising charities via a dummy variable (*type*). This dummy takes the value of 1 if the charity is fund-raising and 0 if grant-making so the higher audit cost associated with the former will be reflected in an expected positive coefficient. As this dummy variable might more usefully be considered an indication of complexity we classify it as such. To test whether the results are sensitive to our choice of size measure, we also use measures based on total assets and on total funds (i.e., the

sum of restricted and unrestricted funds).

Audit costs are likely to benefit from economies of scale since the cost of assessing the control system is relatively fixed in nature and sampling theory dictates that the cost of transaction testing need not increase linearly with the number of transactions. Thus, the use of a non-transformed size variable may not adequately reflect the fee-size relationship. Most previous studies have adopted a log transformation of the size variable to reflect this non-linearity. However, Pong and Whittington (1994) argue against the use of a log transformation of variables, such as size, without explicit consideration of the underlying relationship. They accommodate economies of scale by using a non-transformed asset variable in addition to its squared equivalent. They also recognise the difficulties associated with each of the two main size proxies by incorporating both sales and asset variables in their model. They argue that the resulting multicollinearity between assets and sales does not present a serious problem.[9] Consequently, we also assess the usefulness of incorporating both variables in our models.

To establish the most appropriate functional form of the size measure, preliminary tests of the relationship between charity audit fees and total incoming resources were undertaken.[10] These confirmed that a linear model is inappropriate, but that both a log-linear model and a quadratic model are acceptable; results for both models are reported later.

3.2.2. Auditee complexity

It is likely that the level of audit work will increase with the level of auditee complexity. In previous private sector studies, proxies for complexity have included the number of subsidiaries, the number of industries in which the company participates, the number of different company locations and variables relating to asset composition. To the extent that relevant parallel proxies exist in the charity sector, they have been used, and a number of proxies unique to the sector have also been identified.[11]

The parallel complexity proxies in the charity sector are the number of trading subsidiaries (*subs*),[12] the number of different significant areas of activity (*divers*), the number of trading outlets (*outlets*) and the number of branches (*branch*). The equivalent asset composition proxies, indicating the importance of the relatively 'difficult to audit' asset-classes stock and debtors, were measured as the proportion of total assets represented by debtors (*deb*) and by stock (*stock*).

Several unique dimensions of complexity in the charity sector may impact on the level of audit fees. First, the fundamentally different nature of fund-raising and grant-making charities was as-

[9] They report a bivariate correlation between sales (S) and assets (A) of 0.98 but do not report the results of any further diagnostic tests for multicollinearity. They merely assert that 'The fact that the standard errors [presumably *coefficients* was intended] on S and A in Table 3 are statistically significant at an acceptable level suggests that it (i.e., multicollinearity) is not a serious problem'. Further, Gregory and Collier (1996:20) report having problems with multicollinearity when they used the Pong and Whittington model.

[10] A Mackinnon-White-Davidson (see Gujarati, 1995: 265) test of functional form rejected the linear model and accepted a log-linear model as potentially appropriate. Further evidence from a Durbin-Watson test and the Ramsey RESET specification test (see Gujarati, 1995: 462 ff.) confirmed the linear model as inappropriate, but both log-linear and quadratic models were acceptable. However, the level of heteroskedasticity was much higher for the latter (as Pong and Whittington, 1994, conceded).

[11] A number of standard control variables relating to audit risk are omitted from the models. Some of the omitted variables (e.g. 'loss-making', return on investment) are not relevant to non-profit organisations such as charities. Parallel measures based on operating surplus/deficit would not capture similar risk aspects since charities expect to report deficits. Indeed a deficit could be seen as a measure of success in achieving the aims of the charity! 'Liquidity' measures, such as current and quick ratios, are also omitted from our model specification. In prior studies, the coefficients on these two variables are typically found to be significantly positive and negative, respectively. This suggests that either the two variables are collinear (quite likely given their construction) or that they are proxying for something other than liquidity. For example, the current ratio includes both stock and debtors, both of which are difficult to audit suggesting a positive relationship with audit fees. On the other hand, high liquidity should reduce the likelihood of firm failure, thereby reducing audit risk and implying a negative relationship with audit fees. In view of the difficulty in interpreting results for these variables, we have preferred to include stock and debtor measures separately in our model specification.

[12] Many prior empirical papers have taken the square root (or log) transformation of the number of subsidiaries. Although this has not been adopted in the present paper, additional testing shows that the results are not sensitive to this. In Model 1a, for example, adoption of the square root proxy leads to one very minor change in the significance of variables: the t-statistic for SS changes from 1.98 to 1.90 giving significance at the 10% rather than 5% level (in fact the p-value changes from 0.049 to 0.059).

sessed by incorporating the *type* binary variable (discussed in the previous section); the classification in Barings was adopted here.

Second, it can be hypothesised that a charity's constitution might affect the work required of the auditor and, consequently, the audit fee. This could result from additional reporting requirements to government or regulators, or perhaps from differing trustee (or equivalent) needs for audit assurance. This was explored by categorising the charity as a company, a trust, or one whose constitution was set up by Act of Parliament or Royal Charter. This split was incorporated using dummy variables for the latter two categories ($constT = 1$ if the charity is a trust, $constA = 1$ if Act of Parliament or Royal Charter), leaving company status as the base case.[13] A priori, the expected signs on these coefficients are difficult to predict.

While the diversity of activities within a charity is one potential audit fee determinant (already proxied by *divers*), the specific area of charitable activity might also be important. This is analogous to the argument supporting the use of industry dummies in private sector audit fee studies (e.g., Simunic (1984) and Barkess and Simnett (1994) both found evidence of significant industry factors). To assess this, classifications were extracted from Barings and dichotomous variables constructed for the major areas of activity represented in the sample charities. A charity with at least 50% of its expenditure in a particular area of activity was classified as having a major interest in that area. Five areas of activity had at least 20 sample charities with a major interest in the area, so were considered for inclusion in the model. One of these areas, 'international', was strongly correlated with another variable (*oseas*) and was excluded from the model as the latter was considered more effec-

tive in capturing charities with significant overseas involvement. Thus, four dummy variables representing major areas of activity were included in the model; these were 'culture, sport and recreation (*CSR*)', 'education, training and scientific research (*ETR*)', 'health and medicine (*HM*)' and 'social services and relief (*SS*)'.[14] Charities within other areas of activity acted as the base case.

Other aspects of charities' operations that may impact on audit fees include involvement overseas, significant trading activities, and the importance of fund-raising activities.[15] Overseas involvement (*oseas*) was measured dichotomously, taking a value of 1 if there was any evidence of significant overseas activity within the financial statements. Trading activities are broadly incorporated in the model through the variables 'number of trading subsidiaries' (*subs*) and 'number of trading outlets' (*outlets*). As these two variables are rather crude indicators of trading activities, an additional variable indicating the relative importance of trading in generating income was also investigated. This was measured as the proportion of total incoming resources relating to gross trading activities (*trad%*). Similarly, the binary variable (*type*) based on Barings categorisation of charities as fund-raising or grant-making only crudely captures the importance of fund-raising activities within a charity. So, to capture more accurately the potential increased audit costs associated with the difficulties in control of fund-raising activities, an additional continuous variable *fundr%* was incorporated; this measures the proportion of total incoming resources relating to fund-raising. All three additional variables (*oseas*, *trad%* and *fundr%*) are expected to have positive coefficients.

Finally, it is possible that the number of trustees (or equivalent) might affect audit risk. On one hand, it could be argued that a larger number of trustees might lead to more rigorous governance and a commensurate reduction in audit risk. On the other hand, a large trustee group might lead to a reduction in each individual's perceived responsibility and perhaps fewer meetings, thereby resulting in weaker, less robust, organisational governance. The number of trustees was captured in a variable *trust*, whose expected sign is, a priori, indeterminate.

3.2.3. Audit production costs

In common with private sector audits, two aspects of the audit process are expected to have an effect on audit fees. The location of the audit staff undertaking the audit will affect the costs of employing audit staff, with higher costs associated with the London area. This is proxied by the office location of the audit firm undertaking the audit as indicated in the audit report. A dichotomous measure (*audloc*) is used taking the value 1 if the location

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[13] The coefficient on *constT* measures the incremental audit fee (log transformed) for charities with a 'trust' constitution above the audit fee for the base case of a charity with a 'company' constitution; a similar argument applies to *constA*.

[14] It is possible that the financial statements of housing group charities may differ significantly from other charities (e.g. the amount of land stock may be expected to be much higher) and that this may affect some of the key ratios. The sensitivity of the results to this was tested in two ways. First, inclusion of an extra dummy variable for charities in this subsector was incorporated in the basic model (1a). The coefficient on this dummy was insignificant (t-stat = 0.56) and there was a minor change in the significance of just one of the control variables (*divers*, marginally ceased to be significant; p value = 0.115). Second, the regression was re-estimated excluding all housing group charities; there were no changes in variable significance. We are grateful to one of the referees for drawing this point to our attention.

[15] A charity auditor suggested that the variety of different sources of income also affects the level of audit fees. To the extent that charities in a particular sector have similar sources of income, this aspect is proxied by the 'area of activity' dummy variables.

was London and 0 if elsewhere, and a positive co-efficient is expected.[16]

The majority of UK private sector companies have either December or March year-ends, causing considerable seasonality of audit work for audit firms. It is hypothesised that audits performed around this busy period will be more costly because of the increased demand for auditors' services. This potential 'busy season' factor is captured by a dichotomous year-end variable (ye) that has a value of 1 if the year-end is in December, January, March or April and 0 otherwise.

3.2.4. Non-audit services

Many private sector studies in the US (e.g., Simunic, 1984; Simon, 1985; Davis et al.; 1993), in Australia (e.g., Barkess and Simnett, 1994), in Norway (Firth, 1997) and in the UK (Ezzamel et al., 1996) have observed a significant positive association between audit fees and payments to auditors for non-audit services. Several explanations for this positive relationship have been proposed, including knowledge spillovers between audit and non-audit services, but a consensus view has not emerged. The association in the charity sector is investigated by inclusion of a continuous variable, the fees payable to auditors for non-audit services (nasfee), in the audit fee model.

3.2.5. Audit difficulties

A qualified audit report, or a long lag between year end and audit report completion, often reflects difficulties in the auditee organisation (e.g., fraud or going-concern problems), potentially increasing audit risk. It is expected that this would lead to an increased audit fee either because additional audit work is required, or to reflect an element of insurance premium to compensate the auditor for the additional risk. Positive coefficients

on proxies for these two variables have been found in previous studies of private sector firms (e.g., for audit delay: Chan et al., 1993; Ezzamel et al., 1996). However, in charity audits, there is usually less pressure to complete the audit within a short period after the accounting year-end. Thus, for charities, a greater audit 'delay' might also arise because the audit firm had been able to schedule the audit to coincide with 'slack' periods thereby benefiting from reduced marginal staff costs. This would suggest a negative relationship between audit fee and delay. The impact on the level of audit fees of a qualified audit report, here taken as any non-standard features in the audit report, is assessed using a dummy variable (opinion). The potential impact of audit delay is explored by including a continuous audit delay variable (delay), measured as the number of days between the year-end and the date of the audit report.[17] Interestingly, the audit report was undated (and, with one exception, also unsigned) for 22 of the sample charities;[18] the mean audit delay of the other charities was imputed for these charities.[19]

3.3. Experimental variables concerning auditor premia
3.3.1. Big Six brand name premium

Once a basic model of the determinants of charity audit fees has been determined, the presence of auditor premiums can be assessed. Four specific hypotheses are investigated. Hypothesis one investigates the presence of a large firm audit premium in the charity sector. The audit market structure within the sector is especially useful for exploring this issue since Big Six auditors do not dominate the market to the extent that is true for the private sector. In particular, none of the Big Six can be described as having expertise in the sector, based on the usual definition of expertise indicated by 10% market share (e.g., Palmrose, 1986a; Craswell et al., 1995). Thus, any observed premium can be attributed to brand name rather than any specific sector expertise.

The hypothesis can be stated in alternative form as:

H_1: The brand name of large audit firms (the Big Six) is rewarded by a fee premium above non-Big Six firms in the charity sector.

To test for the existence of a large firm audit premium, a binary variable (BIG6) to identify those charities that were audited by one of the Big Six auditors is incorporated in the regression (Model 1 variants).

If evidence of a premium is found, a finer level of detail can be investigated to see whether there is any diversity in reward amongst the Big Six. This leads to the second hypothesis:

H_2: Individual Big Six firms are rewarded by a

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[16] The location of the charity head office, taken from Barings, was investigated as an alternative proxy since a similar variable had been used in a previous study (Brinn et al., 1994). This was strongly correlated with audloc so was excluded from the model.

[17] As a sensitivity check, the basic model (Model 1a) was also re-estimated excluding 18 charities with large audit delays, taken as longer than a 95% one-sided confidence interval (240 days). There were no changes in variable significance.

[18] This somewhat lax attitude to audit reporting demonstrated by over 10% of the sample charities provides another illustration of relatively poor control procedures. The basic model (Model 1a) was re-estimated including a dummy variable for those charities with an unsigned audit report. The coefficient on this dummy was insignificant (t-stat = 0.12) and there were no changes in the significance of other variables.

[19] Mean value imputation is a strategy for dealing with missing values without loss of observations (Little and Rubin, 1989). As a sensitivity check, the basic model (Model 1a) was re-estimated excluding all 22 charities with an undated audit report. There were three minor changes in the significance of control variables: divers and stock ceased to be significant, and the significance of trad% reduced to 5%.

brand name fee premium above non-Big Six firms in the charity sector.

This is tested by incorporating dummy variables for each of the five Big Six firms (*KPMG*, *CL*, *DT*, *EY*, *PW*) that are active in the charity sector (Models 4 to 6).

3.3.2. Specialist premium

While Big Six auditors do not dominate the charity sector market, they still command relatively large market shares (e.g. KPMG audits 6.4% of the Barings 'top 3000'). Ideally, to assess the relative importance of brand name and industry specialisation, a joint analysis would be applied. The approach usually adopted to carry out this joint analysis is to incorporate a 'specialist' variable in addition to the Big Six dummy variable, with an interactive term Big Six*'specialist' to see if Big Six specialists earn a premium over non-Big Six specialists. Unfortunately, there is likely to be significant collinearity between 'specialist' and Big Six variables. This can lead to increased standard errors for the coefficient estimates, tending to reduce statistical significance, and also the coefficients can be more sensitive to sample data, to the extent that coefficient signs can change on introduction of the collinear variable(s) (Gujarati, 1995: 325–335).

In the current study there was indeed significant collinearity between the Big Six and 'specialist'

variables. Introduction of the 'specialist' variable changed the sign of the Big Six coefficient to negative and reduced the significance of both variables.[20] This means that sensible interpretation of the coefficients on these variables was impossible. In view of this, an alternative approach was adopted, in which separate regressions were estimated for Big Six and non-Big Six audit firms; this method has been used in previous studies of audit specialist premia (e.g., Craswell et al., 1995: 310–311). In the separate Big Six regression model (details not reported here), there was no evidence of a fee premium for expertise in Big Six firms. This is not too surprising, given that none of the Big Six firms has a particular comparative expertise/specialism over the other Big Six firms. Specialism in non-Big Six firms is discussed further in the next section.

3.3.3. Non-Big Six specialist premium

The reduced role of Big Six auditors in the charity sector allows pricing by non-Big Six auditors to be investigated, and, in particular, whether there is any evidence of reward for expertise or specialism in the sector. Certainly, some non-Big Six audit firms (e.g. Binder Hamlyn, Horwath Clark Whitehill) market themselves on the basis of specific expertise in the charity sector (see adverts on pages 1.4, 8.7, 8.19 and others, in Barings (1998)), but whether this is rewarded in audit pricing is unclear.

Cullinan (1998: 49–50) discusses various alternative perspectives on audit pricing and the potential impact of market share conditioned on audit expertise. If there are no perceived differences in audit expertise, the impact of higher market share will depend on the approach to pricing adopted by firms. Cost-based pricing would yield lower audit fees as a result of economies of scale reducing per-client costs. If the audit market is characterised by a high degree of concentration, the few firms with a dominant market share could have monopolistic or oligopolistic pricing power, leading to higher audit fees under market-based pricing. If there are perceived (and actual) differences in sector expertise, this will tend to increase overall audit firm costs and the effect on per-client costs will depend on the number of clients in the sector. The impact on audit fees in a cost-based pricing environment is indeterminate. In a market-based pricing environment, greater perceived (and actual) expertise results in higher value audits, for which clients would be willing to pay more since this may reduce agency costs. Thus, higher market share is a signal of greater expertise, which should result in higher audit fees. As market concentration is much lower in the charity sector than in the private sector company audit market, there is less likelihood of monopolistic/oligopolistic pricing by a few

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[20] For example, in the 'All Charities' model (Model 1a) the coefficient on *BIG6* is 0.0963 (t-stat = 1.26) when this variable is included without the *specialist* variable. Including the *specialist* variable instead of *BIG6* gave a coefficient estimate of 0.0014 (t-stat = 1.80, significant at the 10% level). When both variables were incorporated together, without an interactive term, the coefficient for *BIG6* changed sign to –0.0871 (t-stat = –0.71) and for *specialist* became insignificant, even though it increased in size to 0.0020 (t-stat = 1.62). Inclusion of an interactive term as well gave coefficients of –0.1442 (t-stat = –0.53) for *BIG6*, of 0.0018 (t-stat = 1.17) for *specialist* and of 0.0006 (t-stat = 0.23) for the interactive term *BIG6*specialist*. For Fund-raising charities (Model 3), the coefficient on *BIG6* included on its own is 0.1701 (t-stat = 2.00, significant at the 5% level). Including the *specialist* variable instead of *BIG6* gave a coefficient estimate of 0.0019 (t-stat = 2.36, significant at the 5% level). When both variables were incorporated together, without an interactive term, the coefficient for *BIG6* changed sign to –0.0200 (t-stat = –0.13) and for *specialist* became insignificant, even though it increased in size to 0.0021 (t-stat = 1.35). Inclusion of an interactive term as well gave coefficients of 0.1716 (t-stat = 0.60) for *BIG6*, of 0.0031 (t-stat = 1.76, significant at the 10% level) for *specialist* and of –0.0023 (t-stat = –0.84) for the interactive term *BIG6*specialist*. Collinearity between *BIG6* and *specialist* variables (and the interactive term) was evident in both sets of models: relatively high condition numbers associated with high variance proportions were observed (Belsley et al., 1980, Chapter 3). For example, in the 'All Charities' models, a condition number of 12.8 was associated with variance proportions of 0.83 and 0.91 for *BIG6* and *specialist*, respectively. With the interactive term included, the condition number of 26.52 was associated with variance proportions of 0.70 (*BIG6*), 0.34 (*specialist*) and 0.86 (*BIG6*specialist*), respectively.

market leaders. Consequently, observation of a fee premium is stronger evidence that clients are willing to pay higher audit fees to firms with perceived expertise in the sector.

Thus, the third hypothesis focuses on non-Big Six firms (where brand name reputation is much lower) and assesses the impact of expertise on audit pricing in the charity sector:

H_3: Non-Big Six audit firms with expertise are rewarded by a fee premium above other non-Big Six firms in the charity sector.

Expertise is proxied by market share, measured as the number of charities within the top 2,620 that are audited by the firm.[21] A variable (specialist) representing the audit firm's market share is incorporated in a regression based on charities audited by non-Big Six audit firms (Model 7).

If evidence of a premium for expertise is found, a finer level of detail can be investigated to see whether there is any diversity in reward amongst the non-Big Six market leaders in the charity sector. This leads to the fourth hypothesis:

H_4: Individual non-Big Six audit firms with expertise are rewarded by a fee premium above other non-Big Six firms in the charity sector.

Market leadership was based on the ranking in Barings according to the total number of charities audited, and the total audit fees charged (details in Table 1, Panel A). Five non-Big Six firms rank in the top nine on at least one of these two measures and binary variables are incorporated in the regression for these firms (Model 8). Table 2 (Panel B) provides definitions of the experimental variables, their names, expected coefficient signs and the sources of the data.

3.4. Procedures for comparison between charity and company audit fees

The general regression model described above seeks to explain the factors within the charity sector that contribute to the level of audit fees charged. A second important issue is to consider the impact, if any, that the fundamental charitable nature itself might have on audit fees. Anecdotal evidence, prior expectations and preliminary views at the data gathering stage of the current study all suggest that charity audit fees are lower than those paid by private sector non-charitable companies. There are at least three reasons why this might be the case. First, the risks involved in auditing a charity are certainly different to, and

might well be less than, those of a non-charitable company audit (see Section 3.1 above). Lower risks should lead to lower costs for the audit firm and commensurately lower audit fees are expected if cost-based pricing is followed. Second, it seems likely that charity audits might be seen by the auditing profession as a way of supporting the charitable sector, of 'giving back' to society. Thus, a reduced level of audit fees would represent a form of altruism; in effect, a charitable donation is being made by the audit firm to the charity.[22] Third, there is the possibility that a lower 'market rate' for charity audits might encourage audit firms to use less experienced staff and reduce audit time in trying to minimise losses incurred. The lower audit quality implied by this is of great concern in view of the importance of accountability in maintaining confidence in the charity sector, and of the key role that the independent audit plays in this.

To assess these alternatives, it is necessary to have some 'hard' evidence on the relative size of audit fees in the charity sector. To our knowledge, this issue has not been systematically investigated. Thus our final hypothesis is:

H_5: Charities pay lower audit fees than similar-sized private sector companies.

To allow for different organisational sizes, the basic measure adopted for comparison is audit fee scaled by organisation size. i.e., audit fee per pound of revenue, with revenue measured as total incoming resources (charities) and total sales (companies); two alternative scale measures, total assets and total funds, are also used to check sensitivity. The usefulness of this ratio measure depends upon the assumption that marginal audit costs are constant across the whole range of company and charity sizes. Its limitation is that it does not recognise the expected economies of scale in the audit process. If the size distributions of companies and charities are similar, scale economies will not cause a major problem. However, as we find that their size distributions differ significantly, it is necessary to control further for size to effect a valid audit fee comparison. Initially, a simple size control was investigated by selecting only the subset of companies that fell within the size range (based on revenue) of our charity sample. However, even within this truncated range the distributions of companies and charities are significantly different. There is a much larger concentration of small charities, which would tend to increase the observed mean 'audit fee per pound of revenue' measure for charities. This leads to a bias against the hypothesis that charity audit fees will be lower.

One way to address this problem would be to match each charity within the sample with a single company of similar size. However, this has the

[21] An alternative market share variable, based on total audit fees earned in the charity sector (also taken from Barings, 1998), was incorporated with similar (unreported) results.

[22] An illustration of this was noted during data collection. The charity 'Lloyds TSB Foundation for England and Wales' reported that 'the auditors waived their fee for 1996'.

limitation that the matched company may have idiosyncratic audit risks. An alternative approach, preferred here, is effectively to match each charity. with an *average* similar-sized company (based on total revenue). This is achieved by using a bootstrapping method to control for the scale economies in the audit process. This 'manufactures' a closer size-distribution match between the sample of companies and charities *within* the similar size range. From the existing company sample, a stratified random sample was taken to mirror the distributional properties of the charity sample. Effectively, each charity was matched with a randomly chosen company from the group of companies of similar size and the mean audit fee for the charity and company samples was computed. This sampling process was repeated 1,000 times to reduce the sampling bias that would be introduced if just one such sample were chosen. This enables a distribution of audit fee sample means to be derived, and both the mean and standard error of the distribution to be estimated (Mooney and Duval, 1993).

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[23] Almost identical results (not reported here) were obtained for a sample based on selecting every alternate charity in the top 500 (n= 176). In this model one of the nine significant variables in Model 1a ceased to be significant, namely *SS* with a very marginally insignificant p-value of 0.101. Two of the other eight control variables increased slightly in significance (*divers* to 5%, and *stock* to 1%). The coefficient on the experimental variable *BIG6* increased to 0.1184 but remained insignificant.

[24] Of the charity sample, 84% had year-ends in 1997 and a further 14% had year-ends in the following three months (to 31/03/98), so 98% had year-ends in the 15-month period 31/12/96 to 31/3/98 inclusive. The Barings publication deadline means that some of its data, particularly quantitative financial data collected from financial statements, is not from sources time-coincident with those used for the current study. For our charity sample, 58% of the financial statements used were coincident with those used in Barings; the rest were more recent than those used in Barings by one year (37%), two years (4%) or three years (1%). The majority of data items (about 75%) used in the current study were extracted directly from the accounts provided to us by the charities. With one exception (auditor market share), the few data items extracted from Barings (e.g., areas of charitable activity, grant-making/fund-raising categorisation and auditor market share) are of a categorical nature. All of these items are likely to be relatively stable over time, so the exact matching in terms of year-end is not critical. Furthermore, charities provide additional data to Barings (Barings, 1998:6.III) so any non-financial data included therein is likely to be based on more recent information than the available financial statements. While the non-coincidence in sources for some data items may introduce a source of error into the estimated models, we do not believe that these errors could be significant.

[25] This excludes financial companies and investment trusts. Also, the fact that a proportion of sample charity year-ends fall in the first three months of the next calendar year (see footnote 30) may introduce a small bias in the audit fee comparison. However, inflationary audit fee increases mean that this is likely to be a bias *against* finding that charities pay lower audit fees than companies.

4. Sample selection

Data from the UK was used, as legislation in this country requires the disclosure of key variables, in particular, fees for audit and non-audit services paid to the auditor. The sample was selected from the top 500 charities identified in the 1998 edition of *Baring Asset Management Top 3000 Charities* (Barings, 1998). This covers a wide variety of different types of charity such as the British Council, Wellcome Trust, Oxfam, the Tate Gallery, training organisations (e.g., Construction Industry Training Board), and some housing associations (e.g., Notting Hill Housing Group). Entries are published in respect of the top 2,000 charities, but as a charity can qualify for inclusion on any of three criteria (income, expenditure or funds) approximately 3,000 are published in each edition; in the 1998 edition there are 2,620 charities included. Our objective was to achieve a sample that was representative of the population of major UK charities. Given the economic importance of larger charities, all of the top 100 charities ranked by income were included in our sample.[23] In recognition of the greater homogeneity expected in charities ranked between 101 and 500, every alternate charity was selected to give, overall, a stratified sample of 300 charities from the top 500. Based on charity income reported in Barings (1998), the top 500 charities accounted for approximately 76% of the total income of £13.2bn of the top '3,000' charities. This suggests that our sample should capture audit fee determinants for a large and important part of the charity sector. However, it does not cover the large number of relatively small charities in the sector.

Most of the data items required for the study are not included in Barings (1998), so a considerable amount of data had to be collected manually from the charities' annual reports and accounts (see Table 2 for details). In June 1998, a letter was sent to each of the charities selected, requesting a copy of their latest annual report and accounts, with follow-up letters sent in July 1998. All replies received by September 1998 were included in the study.[24]

For the comparison of audit fees paid by companies and charities, company data for 1997 year-ends were sourced from the UKQI list of industrial and commercial companies on *Datastream*.[25] The particular data items extracted were audit fees (*Datastream* item: 118), total sales (104), total assets (392) and shareholders' capital plus reserves (307). Companies whose revenue fell outside the observed charity size range (based on total incoming resources) were eliminated. Thus, 236 large companies with sales above £440m and 30 small companies with sales below £300,000 were eliminated to leave 1,084 companies.

Table 3
Sample summary

Rank in Barings 'Top 3000'	1–100		101–500		Total	%
Selection basis	all		every other one			
Possible sample size	100		200		300	100.0
Reason for exclusion						
Accounts not received from charity	25		58		83	27.7
Audit fee = £nil/ other reason[1]	4		3		7	2.3
Final sample	71		139		210	70.0
Types of charity in final sample						
Fund-raising	48		94		142	67.6
Grant-making	23		45		68	32.4
Total	71		139		210	100.0

Types of audit firm in final sample

	BIG SIX		Non-BIG SIX		Total	
	No	%	No	%	No	%
Fund-raising	62	43.7	80	56.3	142	100.0
Grant-making	26	38.2	42	61.8	68	100.0
Total	88	41.9	122	58.1	210	100.0

Notes
1. Other reasons for exclusion were: accounts denominated in a foreign currency (1); out-of-date or incorrect accounts submitted (2); fee requested (2).

5. Results

5.1. Descriptive statistics

Table 3 provides a descriptive summary of the 210 charities in the final sample. From this table it can be seen that 83 charities (28%) failed to provide accounts, a level of non-response which is broadly similar to the 19% obtained by Hyndman (1990). All charities are required by law[26] to make a copy of the accounts available to anyone requesting them, though they may charge a reasonable sum to cover copying and postage costs. Thus, a significant proportion of charities failed to comply with the law. This is a disturbing indictment of the basic system of governance in the charitable sector, especially given that all of the

[26] For incorporated charities, and unincorporated charities in England and Wales, Section 47 of the Charities Act 1993 (Part VI) refers. Equivalent regulations for unincorporated charities in Scotland are included in the Law Reform (MPS) Act 1990 and the Charities Accounts (Scotland) Regulations 1992.

[27] Barings express some concern over their classification. 'In charity parlance, the expression "grant maker" is epitomised by a foundation exclusively engaged in making grants, mainly to other charities, out of income earned on its investments. There are many charities which fit this description precisely. However, there are a considerable number of others making grants in the normal course of their activities which do not..... In the circumstances, there are no clearly defined and generally accepted criteria by which to judge whether certain charities should or should not be described as grant makers. Wherever possible, charities are categorised in accordance with how they perceive themselves' (Barings, 1998: 6.II). Thus, the dichotomous classification must be viewed with caution.

sample charities are relatively large.

Three tests for response bias were performed on the full complement of 300 charities. First, the Wilcoxon-Mann-Whitney non-parametric test was used to compare responding and non-responding charities on the basis of size (measured as total income, as reported in Barings, 1998). The hypothesis that the two groups have been drawn from the same population could not be rejected (even at the 10% significance level). Second, the proportion of grant-making and fund-raising charities in both groups was compared and found to be identical. Third, the date of the most recent accounts available to Barings for its 1998 statistical compilation (Barings, 1998) was examined. Eight (9%) of the non-respondent charities had out-of-date accounts (dated prior to 1 January 1996, i.e., more than 30 months prior to our investigation). Taken together, these results suggest that response bias is unlikely to be a serious threat to the validity of the results, though charities with 'old accounts' (and their special circumstances) are perhaps not adequately represented. Unfortunately, data availability is a constraint in many empirical studies that use publicly available sources.

Of the 210 usable responses, Table 3 shows that 142 (68%) were classified by Barings as fund-raising and 68 (32%) as grant-making charities.[27] It also demonstrates that Big Six audit firms were responsible for 42% of the audits in our sample. This percentage is higher than the overall Big Six market share of 25% reported in Table 1, and reflects the greater preponderance of Big Six firms en-

Table 4
Summary statistics of variables (n = 210)

	Mean	Median	Min	Max	Standard deviation	Skew	Kurt	Corr with audfee
Audit fees								
audfee (£000)	25.649	18	0.6	263	29.122	4.28	26.83	1.00
lnaudfee	2.860	2.89	−0.511	5.572	0.872	−0.07	0.85	0.80 ***
Auditee size								
totir (£000)	27,199	13,205	313	433,864	44,672	5.54	40.86	0.60 ***
asset (£000)	113,594	15,348	673	8,583,934	643,232	11.79	149.18	0.35 ***
totf (£000)	99,521	10,609	1	8,137,613	611,760	11.78	148.31	0.34 ***
lntotir	9.617	9.488	5.746	12.98	1.044	0.12	1.16	0.61 ***
lnasset	9.900	9.639	6.512	15.965	1.587	0.55	0.50	0.48 ***
lntotf	9.314	9.270	0	15.912	2.072	−0.52	2.29	0.42 ***
Auditee complexity								
subs	0.995	0	0	8	1.446	2.23	6.56	0.26 ***
divers	1.100	1	1	4	0.397	4.56	22.68	0.01
outlets	10.06	0	0	585	62.59	7.14	53.45	0.15 **
branch	36.18	0	0	2,000	186.76	7.56	67.30	0.13 *
deb	0.112	0.053	0	0.733	0.144	2.16	4.62	−0.04
stock	0.013	0.002	0	0.365	0.039	6.32	46.09	−0.03
type	0.676	1	0	1				0.10
constT	0.233	0	0	1				−0.06
constA	0.214	0	0	1				0.27***
CSR	0.138	0	0	1				−0.04
ETR	0.110	0	0	1				0.01
HM	0.248	0	0	1				−0.09
SS	0.152	0	0	1				0.21***
oseas	0.167	0	0	1				0.21***
trad%	0.257	0	−0.006	21.534	1.579	12.17	160.74	−0.03
fundr%	0.208	0.037	0	0.989	0.298	1.32	0.31	0.07
trust	19.39	16	3	150	15.87	3.84	24.18	0.20 ***
Audit production costs								
audloc	0.552	1	0	1				0.25***
ye	0.805	1	0	1				0.00
Non-audit services								
nasfee (£000)	7.187	0	0	89	14.361	3.01	10.23	0.37 ***
Audit difficulties								
delay (days)	140.5	134	23	513	65.0	1.93	7.41	0.01
opinion	0.033	0	0	1				0.03
Auditor premium								
BIG6	0.419	0	0	1				0.03
KPMG	0.095	0	0	1				0.03
CL	0.086	0	0	1				0.02
DT	0.105	0	0	1				0.05
EY	0.038	0	0	1				−0.09
PW	0.095	0	0	1				0.00
specialist	78.1	68	1	167	54.8	0.15	−1.18	0.18 ***
BH	0.076	0	0	1				0.38 ***
GT	0.038	0	0	1				−0.05
HCW	0.033	0	0	1				−0.07
BDO	0.024	0	0	1				−0.03
NAO	0.062	0	0	1				0.05

***, **, and * represent significance at the 1%, 5% and 10% levels respectively (two-tail).

gaged in the audit of larger charities, which form the basis of our sample.

Table 4 provides summary statistics for each of the variables, including non-transformed size variables. Audit fees ranged from £600 to £263,000 with a mean of £25,649. Charity size, based on total incoming resources (*totir*), ranged from a low of just £313,000[28] to a high of £433.9m, and averaged £27.2m. As in previous studies on private sector companies, the correlation of 0.60 between audit fees and size is quite strong, suggesting that size is a major determinant of charity audit fees. Further, the positively skewed and leptokurtic nature of both audit fees and size encourage the use of transformed variables to improve their distributional properties. The alternative measure of size based on total assets (*asset*) covers a very wide range up to an extremely large £8,584m, and is less strongly correlated with audit fees (correlation coefficient = 0.35); similar observations relate to the total funds variable (*totf*). The wide range and relatively low correlation for these two size measures reflects the important difference in the nature and level of assets between fund-raising and grant-making charities and is the major reason for choosing total incoming resources as the most appropriate size proxy.

For the binary variables, the 'mean' value represents the proportion of charities that possess the particular characteristic. For example, the mean value of 0.676 for *type* shows that 67.6% of the charities were in the fund-raising classification, leaving 32.4% as grant-making. The constitution variables indicate that 23.3% are trusts (*constT*), 21.4% were set up by Act of Parliament or Royal Charter (*constA*) and, therefore, the remaining 55.3% are charitable companies. The 'health and medicine' variable (*HM*) shows that almost 25% of the sample charities were significantly involved in this area of activity and that this represents the most common area. On average, gross trading (*trad%*) accounts for approximately 26% of incoming resources, but this relatively large proportion needs to be interpreted with care. First, the mean is heavily distorted by one or two major out-

liers (the maximum *trad%* value of 21.53 implies that gross trading represented 2153% of total incoming resources in one particular charity), and so the median of 0% may be more representative. This more closely reflects the fact that only 94 of the 210 charities (45%) undertook trading activities. Second, further analysis of the basic data reveals that the net contribution from trading (i.e., after deducting trading expenses) accounts for just 5.4% of total incoming resources, on average.

Further points to note from the summary statistics are:

- *audloc* shows that 55.2% of the audit firms were London-based.

- *ye* indicates that a large proportion (80.5%) of charity year-ends are in the audit 'busy-season' around December and March, implying that charities have probably not chosen their year-ends in order to fit in with auditor slack periods.

- *nasfee* has a significant positive correlation with audit fees and a mean value of £7,187 representing 28% of audit fees. Further analysis showed that 44% of the charities reported non-zero fees for non-audit services with just 7% reporting *nasfee* higher than audit fees. This contrasts with the UK company results of Ezzamel et al. (1996) who found that non-audit services represent a much higher proportion of audit fees (87%), that 93% of their sample of companies had non-zero *nasfee*, with 44% reporting higher *nasfee* than audit fees. Non-audit services are apparently much less important in the charity sector.

- *delay* has a mean of 140 days implying a period of about 4½ months between year-end and audit report signing.[29] This compares with mean delays of between 53 and 96 days reported for private sector companies in various international studies (see Carslaw and Kaplan, 1991: 22, and references therein).

- the *specialist* variable is significantly correlated with audit fee, suggesting that sector expertise might be rewarded with a fee premium. Of the individual audit firm variables, Binder Hamlyn (*BH*) shows a significant positive correlation with audit fee size, suggesting the existence of a premium to one of the market leaders in the sector. Deloitte Touche (*DT*) carried out the most audits (10.5%).

5.2. Charity audit fee model

As expected, the bivariate correlations suggest that the major determinant of audit fees is the size of the charity (with a correlation of 0.60). Other potentially important factors (indicated by significant correlations at the 5%, two-tailed, level) include the number of trading subsidiaries (*subs*: 0.26), the number of trading outlets (*outlets*: 0.15),

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[28] The total income of the smallest charity in our 'top 500' sampling frame according to Barings was £4.7m. Our definition of total incoming resources is slightly different and component details were extracted directly from the financial statements rather than Barings. These differences mean that a small number of charities (approximately 12) would not be classified within the top 500 based on our measure. However, these charities have been retained within our sample.

[29] The one major outlier of 513 days related to a charity whose charitable status was under investigation by the Inland Revenue; one further charity had a delay of 471 days. These are the only two sample charities with delays beyond the 10-month time period by which annual reports must be filed with the Charity Commission and/or with Companies House (S45, The Charities (Accounts and Reports) Regulations 1995 (SI 1995 No. 2724) and S.244(1) of the Companies Act).

the constitution of the charity when set up by Act of Parliament or Royal Charter (*constA*: 0.27), principal area of activity in social services and relief (*SS*: 0.21), significant involvement overseas (*oseas*: 0.21), the number of trustees (*trust*: 0.20), the location of the audit firm (*audloc*: 0.25) and the fee paid to the auditor for non-audit services (*nasfee*: 0.37). However, as virtually all of these are also significantly correlated with size (*lntotir*), the outcome of the multivariate analysis is not easy to predict. One further observation from the full correlation matrix (not reported) is that, apart from high correlations between alternative size proxies, none of the other correlations between independent variables is particularly high (the highest is 0.37). This suggests that multicollinearity may not normally be a serious problem in the regression model.

5.2.1. Basic model

The OLS multivariate regression results for the basic model and the full sample of charities (n = 210) are reported in Table 5 (Model 1a).[30] This model uses log-transformed total incoming resources (*lntotir*) as the size proxy.

The results for Model 1a confirm size (*lntotir*) as the major audit fee determinant, with a highly significant t-ratio of 9.01. The positive coefficient of 0.4739 implies that, *ceteris paribus*, audit fees increase approximately with the square root of total incoming resources, consistent with many previous private sector studies (see summary in Chung and Lindsay, 1988: Table 11). Of the seven other variables that were significantly correlated with *audfee* (see Table 4), only three (*subs*, *audloc* and *nasfee*) are confirmed as significant determinants in the multivariate model (at the 1% level). Two further variables are significant at the 1% level (*type* and *trad%*), two at the 5% level (*stock* and *SS*) and one at the 10% level (*divers*).

The results suggest that a number of general organisational characteristics, in addition to characteristics unique to the charity sector, are associated with differences in charity audit fee levels. In common with private sector studies, the number of trading subsidiaries (*subs*) and the proportion of total assets represented by year-end stock (*stock*)

are positively associated with audit fees. These are consistent with, respectively, the additional audit work to meet statutory requirements and the uncertainties in valuing and confirming the valuation of stock. The significant negative coefficient on the diversity measure (*divers*) is contrary to expectation (but see later result for fund-raising subsample). However, the coefficient estimate may be somewhat unreliable as the *divers* variable is found to be significantly collinear with size measures.

The dummy variable *type* seeks to capture the fundamentally different nature of fund-raising and grant-making charities, with the positive coefficient implying that the greater complexity and control difficulties of the former group are reflected in higher audit fees. The form of a charity's constitution (company, trust etc.) does not seem to impact on audit fees. Generally, the principal area of activity of a charity does not affect audit fees except for those charities within the 'social services and relief' sector (dummy variable SS), which have higher audit fees. As suggested earlier, this might reflect additional reporting or audit requirements imposed by the fund-providers as a condition of funding.[31] The relative importance of trading activities in generating income (*trad%*) is a significant audit fee determinant, in line with expectations, but the relative importance of fund-raising activities is not.

The significantly positive coefficient on *audloc* suggests that, as expected, the higher audit production costs incurred by London-based auditors are passed on to charities in higher audit fees. However, there is no evidence of additional fees related to audit firm busy periods (*ye*) or short audit delays (*delay*). These observations are consistent with audit firms seeking to minimise increased production costs by scheduling charity audits in slack periods. A non-standard audit report (*opinion*) does not appear to have a significant impact on audit fees.

As in previous private sector studies, there is a significant positive relationship between audit fees and fees paid to auditors for non-audit services (*nasfee*). Thus, in the charity sector also, there is no evidence that auditors use audit fees as a form of 'loss-leader' nor that cost savings from the joint provision of audit and consultancy services are passed on to the charity in the form of lower audit fees (or consultancy fees).

Overall, the adjusted R[2] of 62% implies that a good proportion of the cross-sectional variation in audit fees is explained by the model. An appropriate comparison can be made with prior studies on smaller private sector companies, since all but a small number of charities would be classified as small in the UK private sector. Thus, our R[2] of 62% is in line with previous studies on smaller companies (e.g., 55% by Brinn et al., 1994; 62%

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[30] Notwithstanding the uni-directional alternative hypotheses for approximately half of the variables, all significance levels in Tables 5 and 6 are reported using the more conservative two-tail tests. All procedures were carried out using the SHAZAM v8.0 econometrics program.

[31] This argument was confirmed by one of the charity auditors who provided comments on the draft paper: '*Social services/relief charities are often involved with their local authorities in one way or another, and this tends to bring in Audit Commission requirements that add to the cost of their statutory audit!*' Another auditor suggested that social services charities tend to employ a relatively large number of staff; this increases audit risk, audit work and audit fees.

Table 5
Basic model for alternative size proxies and specifications:
OLS multivariate regressions on all sample charities with _lnaudfee_ as dependent variable

Size proxy:		ln(totir) MODEL 1a (Basic model)		ln(assets) MODEL 1b		ln(total funds) MODEL 1c		ln(totir) AND ln(assets) MODEL 1d		totir AND totir² [quadratic model] MODEL 1e	
Variable	Exp sign	coeff	t-stat	coeff	t-stat	coeff	t-stat	coeff	t-stat	coeff	t-stat
Control variables											
lntotir	+	0.4739	9.01***					0.4007	5.62***		
lnasset	+			0.2801	7.01***			0.0844	1.86*		
lntotf	+					0.2023	6.62***				
totir	+									1.68×10^{-3}	7.71***
totir²	–									-2.94×10^{-9}	-4.76***
subs	+	0.0949	4.98***	0.1052	4.45***	0.1301	5.44***	0.0869	4.46***	0.1200	5.91***
divers	+	-0.2057	-1.74*	-0.4819	-3.04***	-0.4406	-2.79***	-0.2901	-2.26**	-0.1801	-1.42
outlets	+	0.0010	1.27	0.0017	2.88***	0.0018	3.02***	0.0010	1.44	0.0012	1.38
branch	+	0.0001	0.90	0.0002	1.50	0.0003	1.87*	0.0001	0.83	0.0001	0.38
deb	+	-0.2589	-0.94	0.8655	2.52**	0.6879	2.00**	0.0686	0.21	-0.3179	-1.02
stock	+	1.5305	2.62**	1.7672	2.03**	1.8799	1.81*	1.6303	2.45**	1.8762	2.82***
type	+	0.2560	3.09***	0.2790	2.77***	0.2836	2.78***	0.2605	3.11***	0.2696	3.01***
constT	+ or –	0.0537	0.55	-0.0569	-0.47	-0.0479	-0.41	0.0050	0.05	0.0287	0.27
constA	+ or –	0.0925	0.91	0.0856	0.71	0.0758	0.60	0.0599	0.57	0.0747	0.72
CSR	+ or –	0.1531	1.06	0.3074	2.13**	0.4922	3.46***	0.1771	1.23	0.2238	1.53
ETR	+ or –	-0.1063	-0.97	0.0302	0.26	-0.0203	-0.17	-0.0837	-0.78	-0.0046	-0.04
HM	+ or –	-0.0610	-0.56	0.0325	0.28	0.0034	0.03	-0.0363	-0.34	-0.0359	-0.33
SS	+ or –	0.2398	1.98**	0.2085	1.35	0.2108	1.32	0.2225	1.82*	0.1984	1.35
oseas	+	0.1161	1.02	0.3710	2.97***	0.3713	2.90***	0.1659	1.46	0.1244	1.06
trad%	+	0.0007	3.97***	-0.0001	-0.63	-0.0002	-1.73*	0.0006	3.33***	-0.0000	-0.37
fundr%	+	-0.0004	-0.27	-0.0002	-0.11	-0.0011	-0.63	-0.0003	-0.21	-0.0001	-0.05
trust	+ or –	0.0044	1.62	0.0038	1.30	0.0038	1.37	0.0040	1.49	0.0047	1.85*
audloc	+	0.2612	3.28***	0.3383	4.21***	0.3144	3.77***	0.2610	3.33***	0.3281	4.16***
ye	+	-0.0469	-0.48	0.0004	0.00	0.0018	0.02	-0.0343	-0.36	-0.0213	-0.20

Table 5 *(continued)*
Basic model for alternative size proxies and specifications:
OLS multivariate regressions on all sample charities with *lnaudfee* as dependent variable

Size proxy:		*ln(totir)* MODEL 1a (Basic model)		*ln(assets)* MODEL 1b		*ln(total funds)* MODEL 1c		*ln(totir) AND ln(assets)* MODEL 1d		*totir AND totir²* [quadratic model] MODEL 1e	
Variable	*Exp sign*	*coeff*	*t-stat*	*coeff*	*t-stat*	*coeff*	*t-stat*	*coeff*	*t-stat*	*coeff*	*t-stat*
nasfee	+ or −	0.0097	3.47***	0.0115	3.42***	0.0131	3.92***	0.0092	3.26***	0.0106	3.71***
delay	+ or −	−0.0002	−0.26	−0.0002	−0.26	−0.0003	−0.50	−0.0002	−0.34	0.0001	0.12
opinion	+	−0.1412	−0.50	−0.1861	−0.77	−0.2210	−1.01	−0.1694	−0.62	−0.1863	−0.65
Experimental variables											
BIG-6	+	0.0963	1.26	0.1422	1.79*	0.1933	2.35**	0.1003	1.33	0.1523	1.96*
constant		−2.1104	−4.05***	−0.3422	−0.87	0.4972	1.58	−2.1755	−4.26***	1.8826	7.88***
n		210		210		210		210		210	
Adj Rsq		0.624		0.539		0.524		0.630		0.569	
F		15.47***		11.16***		10.59***		15.21***		12.05***	
Jarque-Bera		1.09		17.30***		21.04***		1.11		45.65***	
Breusch-Pagan-Godfrey		43.46***		50.95***		49.48***		46.83***		50.12***	

***, ** and * represent significance at the 1%, 5% and 10% levels respectively (two-tail).
White's (1980) heteroskedastic-consistent covariance matrix estimation is used to adjust for heteroskedasticity.

for the small-firm sub-sample in Chan et al., 1993) but is lower than reported in large company models (e.g., 87% by Chan et al., 1993). This explanatory power compares favourably with that obtained in other studies that seek to develop audit fee models in niche markets (for example, Cullinan (1997) obtains an R^2 of 0.39 for the US pension plan market).

5.2.2. Sensitivity of basic model to alternative size proxies and specifications

Given the difficulties involved in selecting an appropriate size proxy (see Section 3.2.1 above), the OLS regression results for two alternative size proxies and two alternative size specifications are reported in Table 5 (last four columns, Models 1b through 1e). Model 1b uses log-transformed total assets (*lnasset*), Model 1c uses total funds (*lntotf*) and Model 1d uses both incoming resources and assets together. The final column (Model 1e) reports a quadratic specification based on total incoming resources.

Six key explanatory variables (the size proxy, *subs*, *stock*, *type*, *audloc* and *nasfee*) are significant across all models. Several variables (*divers*, *outlets*, *deb*, *CSR*, *SS*, *oseas* and *trad%*) are significant in some of the models but not others. The remaining 10 variables do not appear to be significantly related to charity audit fees in any of the models. Thus, there appears to be substantial consistency across the models. The inclusion of two size proxies (Model 1d) adds little, since results almost identical to those of the simpler Model 1a are obtained. Also, interpretation of the relative importance of the two size aspects from this model is problematic due to the significant collinearity between the two size measures. The positive coefficient on *totir* and the negative coefficient on *totir*^{2} in the quadratic specification for size (Model 1e) are consistent with the expected economies of scale in the audit process. However, this specification has little impact on the significance of the other explanatory variables. Overall, these results suggest that the major findings are robust to alternative size proxies and specifications. In view of this, later results will be presented for just one model (Model 1a) based on the log-linear model with *lntotir* as the size proxy. This model has good explanatory power and has better diagnostic characteristics than the others, especially in terms of normality of residuals, thereby leading to more robust t-statistics.

5.2.3. Big Six premium

Based on Model 1a, the BIG6 coefficient is positive but not significant, suggesting that, in aggregate, there is no evidence of a general Big Six audit fee premium in the charity sector (Hypothesis 1 is rejected). However, the coefficient *BIG6* is consistently positive, and three of the alternative models in Table 5 do show relatively weak levels of significance, suggesting that this result may be somewhat sensitive to the size proxy or model specification. Overall, there appears to be some (weak) evidence of a Big Six brand premium in the charity sector (Hypothesis 1).

5.2.4. Comparison between fund-raising and grant-making charities

The observation of a significant coefficient on the variable *type* indicates that fund-raising charities pay higher audit fees, on average, than grant-making charities. However, the potential impact on audit fees of their different operating characteristics merits further investigation. Table 6 (panel A) reports the results of re-estimating Model 1a separately for grant-making (Model 2) and fund-raising charities (Model 3).

The major contrast between the two is the number of significant explanatory variables. Grant-making charities (Model 2) have just three significant variables compared with 11 for fund-raising charities (Model 3), with only size (*lntotir*) significant at the 1% level, the number of trading subsidiaries (subs) at the 5% level[32] and *CSR* (major activities in Culture, Sport and Recreation) marginally significant at the 10% level. This is consistent with the view of grant-making charities as a relatively homogeneous group, in which size and statutory obligations are the major determinants of audit fees.

By contrast, the factors that determine the audit fees of fund-raising charities (Model 3) are much more diverse, consistent with greater heterogeneity in the group. This, and the larger number of charities classified as fund-raising, contributes to the similarity between the 'fund-raising' and 'all charities' results. However, there are three differences in the control variables for the 'fund-raising' group. The sign on the diversity measure (*divers*) changes to positive and is now significant at the 1% level, conforming with priors that audit fees will be greater in charities with more diverse operations. The number of branches (*branch*) coefficient becomes significant (1% level), in the direction expected. Fund-raising charities set up as trusts (*constT*) also seem to pay higher audit fees.

Results for the Big Six experimental variable are quite different between the two. For grant-makers, Model 2 shows that *BIG6* continues to be non-significant, but for fund-raisers *BIG6* is significant at the 5% level. This result is confirmed using the

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[32] Grant-making charities include the likes of *Save the Children Fund*, *Help the Aged*, and *Cancer Research Campaign*. Notwithstanding their classification as grant-making, these organisations also undertake significant fund-raising activities, often via trading subsidiaries.

other size proxies: all five models show the *BIG6* coefficient as non-significant for grant-makers, and significant at the 5% (or 1%) level for fund-raisers. Thus, there appears to be reliable evidence of a Big Six brand premium in the fund-raising sub-sector of the charity market. The size of the *BIG6* coefficient (0.1701) in the log-linear specification (Model 3), is equivalent to a premium of 18.5% above non-Big Six auditors, on average (Simon and Francis, 1988: 263, provides details of the calculation).

The observation of a brand name premium in only the fund-raising sub-sector is not too surprising. Fund-raising charities have greater need of public confidence, in order to continue to raise funds, and therefore stand to benefit most by employing a high-profile auditor as a symbol of high accountability. It is possible that this need increases the relative bargaining position of Big Six auditors, enabling them to charge a premium. In contrast, it may be difficult to justify charging a premium to grant-making charities where the need for a symbol of high accountability is less, and where the audit process is relatively straightforward. An offsetting factor is that the significant 'negative premium' charged by Ernst & Young is partially obscuring the overall Big Six results in the grant-making charities sub-sector.[33]

Formal tests confirmed that the two sub-sample models (i.e., 2 and 3) are significantly different. The Chow test is significant at the 1% level and, using the dummy variable approach (Gujarati, 1995: 512), the coefficients on three variables are significantly different: *audloc* at the 1% level (two-tail), and *lntotir* and *divers* at the 10% level. These tests suggest that audit fee determinants differ between grant-makers and fund-raisers, implying that the pooled estimates should be treated with some caution.

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[33] To assess the importance of this impact, the Big Six brand premium regression for grant-makers (Model 2) was re-estimated with the exclusion of the (three) charities audited by Ernst & Young. The *BIG6* coefficient increased in size from 0.0704 to 0.2054 but remained statistically insignificant (t-stat = 1.43).

[34] Formal tests again confirmed that the two sub-sample models (i.e., 5 and 6) are significantly different. The Chow test is significant at the 1% level and, using the dummy variable approach (Gujarati, 1995:512), the coefficients on three control variables are significantly different at the 5% level (two-tail): *audloc*, *lntotir* and *divers*. The experimental dummy variable *EY* is also significantly different at the 5% level.

[35] The result for individual Big Six firm premia are generally consistent across all size proxies and specifications, but with some changes in significance levels.

[36] The mean (median) audit fee for fund-raising charities is £27,730 (£18,000) compared with £21,303 (£16,000) for grant-making charities. The mean total incoming resources are £26.55m and £28.56m respectively. Excluding outliers, the ratio of audit fee to total incoming resources for fund-raising charities is 0.150%, and is statistically higher (at the 5% level, two-tail) than the 0.118% for grant-makers.

5.2.5. Individual Big Six firm brand premia

Panel B of Table 6 reports the results of testing for individual Big Six firm premia based on the *lntotir* size proxy. In the 'all charities' regression (Model 4) four of the five Big Six firms involved in the charity sector have positive coefficients, and one significantly positive (*KPMG*) (thus hypothesis 2 is partially accepted). The other firm, Ernst & Young (*EY*), has a significant negative coefficient. However, this overall picture again obscures some differences between grant-making and fund-raising charities.[34] For grant-makers (Model 5), *KPMG* is significantly positive and Ernst & Young significantly negative, mirroring the overall results. For fund-raisers, *KPMG* is significantly positive (now at the 5% level) but Ernst & Young is now positive, but not significant.[35]

Thus, there is convincing evidence that KPMG enjoy higher audit fees, especially in the fund-raising sub-sector; they charge a premium of about 40%, on average, above the audit fees charged by non-Big Six auditors. On the other hand, not all of the Big Six seem to benefit from their brand name. In particular, Ernst & Young audits seem to be priced below the non-Big Six level in the grant-making sub-sector. There are several possible explanations for this. It may be that Ernst & Young adopt a cost-based pricing strategy (i.e., they choose to price below what the market might bear, given their Big Six status). Alternatively, if there is market segmentation between Big Six and non-Big Six firms, the relative weakness (reduced specialism/expertise) of Ernst & Young in the Big Six segment of the charity market may be reflected in lower audit fees.

As a whole, these results confirm that fund-raising charities have more complex operations than grant-making charities, and that these complexities contribute to the higher audit fee observed.[36] Further, these complexities enable some audit firms with a Big Six brand name to benefit from the greater perceived assurance that the brand name provides.

5.2.6. Expertise in non-Big Six audit firms

The results of testing whether a premium is earned by 'specialist' non-Big Six audit firms for expertise in the charity sector are presented in Panel C of Table 6. First, Hypothesis 3 was investigated by incorporating a 'continuous' variable based on market share as a proxy for specialism/expertise. Model 1a (size proxy = *lntotir*) was re-estimated for charities audited by non-Big Six audit firms with the variable (*specialist*) based on the number of charity auditees in the top 2,620 (Barings, 1998). There was no evidence of a premium for expertise in the 'all charities' or 'grant-makers' regressions (details not reported). This is perhaps not too surprising in light of the evidence

Table 6
Testing for fee premia relating to auditor characteristics. OLS multivariate regressions with lnaudfee as dependent variable

| | | Panel A: Big Six brand premium | | | | | |
| | | All charities Model 1a | | Grant-makers Model 2 | | Fund-raisers Model 3 | |
Variable	Exp sign	coeff	t-stat	coeff	t-stat	coeff	t-stat
Control variables							
lntotir	+	0.4739	9.01 ***	0.5711	5.75 ***	0.3995	7.41 ***
subs	+	0.0949	4.98 ***	0.1458	2.25 **	0.0681	2.74 ***
divers	+	−0.2057	−1.74 *	−0.1095	−0.69	1.0049	4.45 ***
outlets	+	0.0010	1.27	0.0005	0.44	0.0005	1.10
branch	+	0.0001	0.90	−0.0003	−0.50	0.0004	3.43 ***
deb	+	−0.2589	−0.94	−1.1313	−1.37	−0.3787	−1.22
stock	+	1.5305	2.62 **	4.0164	1.05	1.0741	2.41 **
type	+	0.2560	3.09 ***	–	–	–	–
constT	+ or −	0.0537	0.55	−0.1202	−0.55	0.2250	2.37 **
constA	+ or −	0.0925	0.91	0.2111	0.85	0.0248	0.21
CSR	+ or −	0.1531	1.06	0.7104	1.71 *	0.1616	1.19
ETR	+ or −	−0.1063	−0.97	−0.0853	−0.23	−0.0792	−0.64
HM	+ or −	−0.0610	−0.56	−0.0295	−0.10	−0.0910	−0.81
SS	+ or −	0.2398	1.98 **	0.1885	0.72	0.2033	1.78 *
oseas	+	0.1161	1.02	0.0400	0.18	0.1466	1.03
trad%	+	0.0007	3.97 ***	0.0055	1.13	0.0005	3.21 ***
fundr%	+	−0.0004	−0.27	0.0029	0.90	−0.0017	−0.98
trust	+ or −	0.0044	1.62	0.0075	1.18	0.0044	1.27
audloc	+	0.2612	3.28 ***	−0.0645	−0.31	0.4637	6.01 ***
ye	+	−0.0469	−0.48	−0.1517	−0.73	0.0745	0.64
nasfee	+ or −	0.0097	3.47 ***	0.0098	1.12	0.0093	3.45 ***
delay	+ or −	−0.0002	−0.26	0.0004	0.34	−0.0005	−0.64
opinion	+	−0.1412	−0.50	−0.0965	−0.17	−0.3848	−1.24
Experimental variables							
BIG6	+	0.0963	1.26	0.0704	0.40	0.1701	2.00 **
KPMG	+ or −						
CL	+ or −						
DT	+ or −						
EY	+ or −						
PW	+ or −						
specialist	+						
BH	+ or −						
GT	+ or −						
HCW	+ or −						
BDO	+ or −						
NAO	+ or −						
constant		−2.1104	−4.05 ***	−3.1158	−3.34 ***	−2.4814	−4.89 ***
n			210		68		142
Adj Rsq			0.624		0.601		0.659
F			15.47 ***		5.39 ***		12.85 ***
Jarque-Bera			1.09		1.58		6.56 **
Breusch-Pagan-Godfrey			43.46 ***		15.27		35.14 *

***, ** and * represent significance at the 1%, 5% and 10% levels respectively (two-tail)
White's (1980) heteroskedastic-consistent covariance matrix estimation is used to adjust for heteroskedasticity when this is evident (i.e., in models 1a, 3, 4, 7 and 8).

	Panel B: Individual Big Six firm brand premia					Panel C: Non-Big Six specialist premia			
All charities Model 4		Grant-makers Model 5		Fund-raisers Model 6		Fund-raisers Model 7		Fund-raisers Model 8	
coeff	t-stat	coeff	t-stat	coeff	t-stat	coeff	t-stat	coeff	t-stat
0.4803	9.06***	0.6037	6.28***	0.3962	7.59***	0.3955	5.04***	0.3906	4.72***
0.0919	4.67***	0.0948	1.49	0.0658	1.96*	0.0918	2.98***	0.0882	2.89***
-0.2452	-2.11**	-0.2192	-1.42	0.9948	1.82*	0.8420	3.47***	0.7802	3.06***
0.0009	1.22	0.0007	0.69	0.0005	0.47	-0.0007	-1.13	-0.0008	-1.27
0.0001	0.91	-0.0000	-0.02	0.0004	1.70*	0.0010	2.39**	0.0009	2.40**
-0.1482	-0.55	-0.3725	-0.46	-0.2849	-0.84	0.8143	2.72***	0.6801	2.37**
1.1557	1.93*	3.8377	1.07	0.8930	0.89	-0.6966	-0.72	-0.1263	-0.11
0.2363	2.99***	–	–	–	–	–	–	–	–
0.0614	0.64	-0.0743	-0.35	0.2241	1.72*	0.2239	1.75*	0.2379	1.76*
0.1018	1.02	0.1079	0.43	0.0377	0.30	0.1404	1.02	0.1633	1.03
0.1332	0.97	0.5192	1.30	0.1360	0.95	0.0157	0.11	0.0623	0.37
-0.1300	-1.25	-0.2311	-0.65	-0.1013	-0.65	-0.3766	-3.06***	-0.3418	-2.73***
-0.0200	-0.18	-0.0396	-0.14	-0.0781	-0.62	-0.0326	-0.22	-0.0275	-0.18
0.2744	2.22**	0.0772	0.31	0.2387	1.67*	0.2437	1.96*	0.2648	1.97*
0.1183	1.07	0.1471	0.67	0.1126	0.80	0.0506	0.29	0.0699	0.34
0.0009	5.21***	0.0048	1.03	0.0006	2.07**	0.0012	1.96*	0.0013	2.01**
-0.0009	-0.58	0.0013	0.38	-0.0021	-1.06	-0.0036	-1.60	-0.0037	-1.57
0.0035	1.42	0.0054	0.90	0.0040	1.37	0.0030	0.73	0.0029	0.68
0.2810	3.43***	-0.0034	-0.02	0.4941	5.34***	0.4442	4.50***	0.5062	4.43***
-0.0630	-0.67	-0.2419	-1.18	0.0603	0.51	-0.0698	-0.44	-0.0968	-0.61
0.0097	3.51***	0.0121	1.42	0.0094	2.99***	0.0063	2.13**	0.0072	1.78*
0.0001	0.17	0.0011	1.02	-0.0003	-0.37	0.0002	0.24	0.0000	0.03
-0.1675	-0.59	-0.2248	-0.41	-0.3745	-1.51	-0.6372	-5.99***	-0.6501	-4.75***
0.2877	1.97*	0.4861	1.92*	0.3439	2.13**				
0.0335	0.24	0.1429	0.49	0.0336	0.21				
0.0590	0.47	-0.1883	-0.61	0.1310	0.88				
-0.4134	-2.19**	-0.9400	-2.30**	0.0730	0.28				
0.1625	1.43	0.1879	0.47	0.2018	1.43				
						0.0050	3.07***		
								0.3994	2.09**
								0.2521	1.86*
								0.0587	0.44
								0.2925	1.85*
								0.0604	0.31
-2.1416	-4.20***	-3.2618	-3.66***	-2.4579	-3.47***	-2.4478	-3.17***	-2.2492	-2.84***
210		68		142		80		80	
0.633		0.651		0.654		0.727		0.700	
13.88***		5.62***		10.88***		10.16***		7.81***	
0.88		0.44		5.29*		10.66***		13.62***	
41.20*		23.58		35.41		50.94***		45.97**	

above that implies that audits of grant-makers are relatively straightforward in comparison with fund-raiser audits. Relative expertise is most likely to be advantageous in the fund-raiser sub-sector, where greater expertise is required and higher accountability desired by the charities concerned.

The results for fund-raising charities audited by non-Big Six audit firms are given in Model 7. Comparison between Model 7 and Model 3 shows that the explanatory power of the model improves slightly (adjusted $R^2 = 72.7\%$), and that most of the control variables are similar for non-Big Six audited charities, though there are some differences. In particular, *deb* becomes significant, but *stock* ceases to be so, charities operating in the 'education, training and research' area (*ETR*) seem to have significantly lower audit fees, and charities with a non-standard audit report (*opinion*) also have lower audit fees. This last observation is contrary to expectation and does not appear to result from any collinearity. This is difficult to rationalise, but one conjecture is that the audit firm recognises the difficulties that the charity is facing and reduces the audit fee to avoid exacerbating the problems. The variable of prime interest in Model 7 is *specialist* and this is significantly positive at the 1% level, suggesting that non-Big Six specialists do earn a premium for their expertise over non-Big Six non-specialist firms [Hypothesis 3 is confirmed].

Model 8 investigates whether individual non-Big Six specialist firms earn a premium for their expertise. Dummy variables were introduced for the top 5 non-Big Six audit firms as outlined in Section 3.3. Three firm dummies were significant, one at the 5% level (Binder Hamlyn (*BH*)), and two at the 10% level (Grant Thornton (*GT*), and BDO Stoy Hayward (*BDO*)). Thus, there is some evidence that individual non-Big Six market leaders in the charity sector obtain a premium over other non-Big Six firms (Hypothesis 4 is accepted). While this evidence is consistent with a premium for expertise in the charity sector, it could also be explained in terms of a second-tier brand name premium.[37] Our method is unable to distinguish between these competing explanations.

5.2.7. Regression diagnostics

To assess the potential impact of outliers on the regression results, influential observations were

explored using both DFFITS and DFBETAS measures (Belsley, Kuh and Welsch, 1980, ch. 2). For example, in the basic model (1a), one observation was identified as highly influential,[38] and a further four or 16 as possibly influential, depending on the criteria adopted. The regression model was re-estimated excluding each of these influential observations individually and together as a group of five or 17. Essentially, there were few changes in the results. The adjusted R^2 values improved and virtually all of the significant variables remained so. When the groups of possibly influential observations were excluded, just *trad%* ceased to be significant and one additional variable (*constT*) became positively significant at the 5% level. Overall, the tests suggest that the results are not driven by outlier observations.[39]

Testing for multicollinearity was carried out using a principal components approach, by observing whether the condition indices were below the suggested cut-off of 15 and/or not associated with high variance proportions on two (or more) variables (Belsley et al., 1980, Chapter 3). Generally, collinearity was not a problem except when both *BIG6* and *specialism* variables were incorporated in a model, as discussed earlier in Section 3.3.2. The assumption that the residuals are normally distributed was tested using the Jarque-Bera statistic (Tables 5 and 6, penultimate row) and accepted in all four models for 'all charities' and 'grant-makers'. For 'fund-raisers', the normality of residuals is reduced and is rejected at various levels of significance in the different models. However, the violation of the normality assumption does not appear to be sufficient to invalidate the use of the t-distribution in significance testing. The assumption of homoskedasticity was formally assessed using the Breusch-Pagan-Godfrey test (Tables 5 and 6, final row) and rejected at the 5% level for Models 1a through 1e, and Models 7 and 8. Thus, the significance levels for the regression coefficients in these models are reported using White's (1980) heteroskedastic-consistent covariance matrix estimation.

5.3. Charity and private sector audit fees compared

One of the objectives of this paper is to assess the impact that the fundamental charitable nature itself might have on audit fees by comparing the size of audit fees paid by charities with those paid by private sector companies. Panel A of Table 7 provides some summary measures for the sample of charities and the company population within the charity revenue range. The mean audit fee for charities of £25,700 is less than one-third of the mean company audit fee of £87,400; the median measures show a similar picture. However, this overstates the difference between charity and company audit fee levels, due to the limitations of this

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[37] Clatworthy et al. (2000) investigated the presence of a second-tier premium in the audit fees of NHS Trust but found no evidence to support this.

[38] This charity had an exceptionally high *trad%* variable that arose from the scaling on a low level of total incoming resources. Its influence on the *trad%* coefficient is significant as indicated by a high DFBETA.

[39] Unfortunately, the existence of influential and outlier observations is rarely reported in audit fee studies (exceptions are Turpen (1990: 67) and Gist and Michaels (1995: 257–8)).

Table 7
Comparison of charity and company audit fees for 1997

Panel A: Comparison of characteristics of sample charities and companies.within charity revenue range (£000)

	Obs	Mean	Median	Min	Max	Stan devn	Skew	Kurt
Charities								
audit fee (*audfee*)	210	25.7	18	0.6	263	29.1	4.28	26.83
total incoming resources (*totir*)	210	27,199	13,205	313	433,864	44,672	5.54	40.86
total assets (*asset*)	210	113,594	15,348	673	8,583,934	643,232	11.79	149.18
total funds (*totf*)	210	99,521	10,609	1	8,137,613	611,760	11.78	148.31
Companies								
audit fee	1084	87.4	54	2	800	92.7	2.37	7.67
total sales	1084	80,225	39,205	346	438,677	96,294	1.69	2.24
total assets	1084	78,685	33,652	420	1,909,284	148,355	6.75	66.02
shareholders' funds (*shfunds*)	1084	39,240	16,433	−91,681	1,314,328	82,152	7.82	90.35

Panel B: Comparison of charity and company audit fee measures[1,2]

	Obs	Mean	Median	Diff in means	t-stat	p-value (1 tail)
All charities						
audfee / totir [%]	207	0.1391	0.1099	−0.0902	−8.582	0.0000
audfee / assets [%]	210	0.1823	0.1064	−0.0600	−3.592	0.0002
audfee / totf [%]	204	0.3658	0.1504	−0.1669	−3.688	0.0001
Companies						
audfee / sales [%]	1064	0.2293	0.1479			
audfee / assets [%]	1080	0.2423	0.1721			
audfee / shfunds [%]	1044	0.5327	0.3462			
Fund-raising charities						
audfee / totir [%]	139	0.1496	0.1223	−0.0797	−6.777	0.0000
audfee / assets [%]	142	0.2113	0.1211	−0.0310	−1.432	0.0770
audfee / totf [%]	136	0.3924	0.1837	−0.1403	−2.760	0.0032

Panel C: Comparison of charity and size-matched company audit fee measures[1,2,3,4]

	Obs	Mean	Diff in means	t-stat	p-value (1 tail)
Audit fee / revenue [%]					
All charities	207	0.1391	−0.1589	−11.547	0.0000
Companies (size-matched)	207	0.2980			
[mean of distribution of 1000 samples]					
Fund-raising charities	139	0.1496	−0.1414	−8.560	0.0000
Companies (size-matched)	139	0.2910			
[mean of distribution of 1000 samples]					

Notes
1. For Panels B and C, extreme outliers have been excluded
   (i.e., ratios > than the upper quartile + 10 x the inter-quartile range, and ratios < 0)
   Inclusion of all outliers:
   (a) Renders ratios involving total or shareholders' funds meaningless (see endnote 46).
   (b) For all charities: mean audfee/totir = 0.1678; companies: audfee/sales = 0.2890; t-stat for difference = −4.859
   (c) For all charities: mean audfee/assets = 0.1823; companies: audfee/assets = 0.2513; t-stat for difference = −3.987
   (d) For fund-raising charities: mean audfee/totir = 0.1918; companies: audfee/sales = 0.2890; t-stat for difference = −3.103
   (e) For fund-raising charities: mean audfee/assets = 0.2113; companies: audfee/assets = 0.2513; t-stat for difference = −1.807
2. In Panels B and C, 'diff in means' = charity mean − company mean.
3. For Panel C, the size distribution of companies (based on sales) was matched with the size distribution of charities (based on totir) by re-sampling from the company sample − see text for more details.
4. The t-stat (and associated p-value) shows the likelihood that the charity sample might be drawn from a population of equivalent-sized companies.

Table 8
Distribution of charity size and company comparison [based on revenue (total incoming resources and sales respectively)]

Revenue £m	Charities			Companies		
	No	% of sample	mean % audfee/totir	No	% of sample	mean % audfee/sales
< 20	126	60.8	0.168	336	31.6	0.449
20 – 40	48	23.2	0.102	188	17.7	0.173
40 – 60	14	6.8	0.096	102	9.6	0.152
60 – 80	6	2.9	0.081	77	7.2	0.122
80 – 100	5	2.4	0.101	72	6.8	0.130
100 – 200	6	2.9	0.052	150	14.1	0.102
200 – 300	0	0.0	na	81	7.6	0.085
300 – 400	1	0.5	0.030	47	4.4	0.073
400 – 440	1	0.5	0.028	11	1.0	0.062
	207	100.0	0.139	1064	100.0	0.229

basic truncated range approach, which are readily apparent.

For example, the median revenue measure for charities (*totir*) is only approximately one-third of the equivalent company measure (*sales*), and for assets about one-half. To get a clearer picture, the level of audit fees *relative* to organisation size was computed and these measures are summarised in Panel B of Table 7. To reduce the significant distortion that some observations were introducing, the measures were computed after excluding all extreme outliers.[40] For comparison, measures including outliers are also reported in a footnote to Table 7.

Charities pay, on average, approximately 0.14% of total incoming resources by way of audit fee in contrast with the 0.23% paid by private sector companies; i.e., the charity audit fee rate is just over half that of private sector companies. This difference is, not surprisingly, statistically significant at the 1% level. The tests based on other size measures yield essentially similar results. However, the validity of these initial comparisons remains open to criticism on two grounds.

First, the sample of charities includes both fund-raising and grant-making organisations. As discussed earlier, grant-making charities are more likely to have a larger proportion of investment-type assets, to operate in a more closely controlled manner with less transactions and have less diversity of operations. Their audit costs are expected

generally to be lower than for fund-raising charities as was confirmed in the charity audit fee regression models. As the company sample does not include any 'similar' financial companies, such as investment trusts, the company audit fee ratio is likely to be biased upwards. This would tend to increase the observed difference in company over charity audit fees. To overcome this problem, a second set of statistics was calculated based only on fund-raising charities and the results are also presented in Panel B. The charity audit fee ratios increase, as expected, but not markedly (e.g., audfee / totir increases to 0.15% from 0.14%). The difference between mean measures for charities and companies remains statistically significant at the 1% level, except for the asset-based ratio which is significant at the 10% level. Thus, the charity audit fee rate appears to be in the region of 65% of the rate of comparable private sector companies.

Second, the size distribution of charities and companies *within* the charity revenue range differs substantially, as illustrated in Table 8, which shows the number and proportion of organisations within nine size intervals. For charities, 174 (84.0%) of the total sample have total incoming resources of less than £40m and fall within the two smallest size intervals, with 60.8% in the smallest category. By contrast, only 49.3% of companies fall within the same two smallest size intervals, with just 31.6% in the smallest category. Thus, there is a relatively larger proportion of small charities than companies and vice versa. This distorts the comparison of audit fees due to the expected and observed economies of scale which occur in the audit process. These scale economies are demonstrated clearly in Table 8, which shows that the mean level of audit fee/revenue increases systematically as organisation size decreases.

To minimise this 'size-distribution' bias, a more

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[40] Extreme outliers are defined as more than 10 × interquartile range above the upper quartile; negative measures for audfee/shfunds are also excluded. Inclusion of all outliers gives meaningless results for ratios based on total or shareholders funds because the major outlier is so extreme (e.g. for charities, 3,875 times as large as the overall median!). For the other ratios, outlier inclusion increased the observed differences between charities and companies in all cases.

precisely size-matched sample of companies was achieved by adopting the 'bootstrapping' method described earlier. The method, based on total revenue, was applied to test for lower audit fees in the sample of all charities (but with outliers excluded), and in the sub-sample of fund-raising charities. The results are presented in Panel C of Table 7.

For the company sample, now properly size-matched with the all-charities sample, the mean of the distribution of audit fee/sales was 0.298% compared with 0.139% for charities. The t-statistic for the difference in means is −11.55 indicating a very high level of statistical significance, and confirming acceptance of hypothesis 5. The results based only on fund-raising charities are similar, with the mean for the size-matched companies of 0.291% again being much higher than the mean value (0.150%) for the charity sample. Thus, in a properly size- and type-matched comparison, the charity audit fee rate is approximately half that of private sector companies.

6. Summary and conclusions

The study develops and estimates, for the first time, a model of charity audit fee determinants. As in previous private sector company studies, size is the major determinant. Several dimensions of organisational complexity (including the number of subsidiaries, and stock level) and audit firm location (i.e., London-based) are also important. Specific charity sector factors that contribute include the importance of trading as a source of charity income, the major area of activity in which the charity operates, and the fundamental nature of the charity (i.e., whether predominantly grant-making or fund-raising). Separate models are developed for the latter two categories of charity and the results reflect the relative complexity of the audit of fund-raising charities. By contrast, grant-making charities are relatively straightforward and their audit fees typically have just two determinants (size and the number of subsidiaries). Auditors' provision of non-audit services is much less important in the charity sector than the UK company sector. However, the somewhat anomalous positive association between audit fees and NAS, which has been observed persistently for non-charitable companies, is also found in the charity sector, particularly for fund-raising charities.

The lower auditor concentration in the charity sector provides a valuable opportunity to investigate whether large firms and/or auditor expertise are rewarded with a fee premium. The results show that Big Six audit firms, on average, receive higher audit fees for audits of fund-raising (but not grant-making) charities. Given that none of the Big Six can be described as having particular expertise in the sector, this premium can be attributed to brand name rather than any specific sector ex-

pertise. The observation of a brand name premium in only the fund-raising sub-sector is perhaps not surprising. Fund-raising charities have greater need of public confidence, in order to continue to raise funds, and therefore stand to benefit most by employing a high-profile auditor as a symbol of high accountability. This may increase the relative bargaining position of Big Six auditors, enabling them to charge a premium. In contrast, it may be difficult to justify charging a premium to grant-making charities where the need for a symbol of high accountability is less, and where the audit process is relatively straightforward.

The size of the premium is approximately 18.5% on average, somewhat smaller than the premium implied in studies of UK private-sector companies. For quoted companies, Chan et al. (1993) found a premium of 36.7%, Ezzamel et al. (1996), 23.5%, and for independent unquoted firms Brinn et al. (1994) found a 28.0% premium. By contrast, neither Che-Ahmad and Houghton (1996), in their study of medium-sized UK companies, nor Clatworthy et al. (2000) in their study of UK National Health Service Trusts found any evidence of a large audit firm premium.

Of the five Big Six auditors active in the charity sector, only KPMG (with the largest number of charities audited) consistently earns fee premiums. By contrast, the audit fees charged by Ernst & Young seem to lower than those charged by non-Big Six auditors in grant-making charities.

There is evidence that market-leading non-Big Six audit firms in the sector are rewarded with a statistically significant fee premium in the more complex audit environment of fund-raising charities, but the average size of this premium above other non-Big Six auditors is not economically significant (only about 0.5%). However, individual non-Big Six auditors with expertise (especially Binder Hamlyn) do appear to earn economically significant fee premia above other non-Big Six firms. Such observations are consistent with a premium either related to charity sector-specific expertise or related to a second-tier brand name premium, but our research approach is unable to distinguish between these competing explanations.

The study also provides preliminary evidence on the overall level of fees paid by charities relative to those prevailing in the private sector. In a properly size- and type-matched comparison, the charity audit fee rate is significantly lower than that of private sector companies; in fact it is approximately half. The magnitude of this differential raises important issues concerning the reasons for the lower charity audit fees. While these issues warrant further investigation, it is likely to be difficult to explain unambiguously the lower charity fees. However, the lower audit fees are certainly consistent with auditors perceiving audit risks to be

lower in the charity sector, and/or with auditor altruism in not charging the 'market rate'. Unfortunately, they are also consistent with lower quality audits, in which audit firms recognise a lower 'market rate' in the charity sector and respond by cutting costs to minimise losses incurred.

Currently, the argument that the *quality* of charity audits might be lower than company audits is difficult to refute. This is potentially damaging to both charities and their auditors. A change in the reporting of charity audit fees could improve the situation where there is an element of 'charitable giving' in the audit fee charged. The gift element could be recognised as such in the income section of the Statement of Financial Activities and the 'full' audit fee charged against the income. Alternatively, disclosure of the information could be included in the notes to the accounts. Either method would provide users of charity financial statements with a clearer indication of the extent of audit work performed and of the level of audit firm altruism, both of which are hidden under current reporting practices. This suggestion is consistent with the move towards the valuation and recognition of gifts and services provided 'in kind' advocated by the revised SORP 2[41] and might usefully be included in a future version of the SORP.

Feedback on the results from a small set of charity auditors was generally encouragingly supportive of the main findings.[42] However, a particular limitation is that the sample of charities was taken from the top 500 charities, and it would be dangerous to extrapolate the results to the rest of the top 3,000 or to the large number of much smaller registered charities.

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[41] Paragraphs 107–108 of SORP 2 give details for recognition of 'gifts in kind' and paragraphs 109–110 concern 'intangible income'. The difficulty associated with valuing voluntary help is recognised in paragraph 110 which recommends that such help should not be accounted for in the *Statement of Financial Activities*, but should be dealt with in the notes to the accounts or in the Trustees' Annual Report. However, valuation of the cost of work carried out by audit firms in conducting the annual audit should not present the same difficulty. In the US, FASB Statement No. 116 *Accounting for Contributions Received and Contributions Made* includes recommendations on contributed services: 'Contributions of services are recognized only if the services received (a) create or enhance assets or (b) require specialized skills, are provided by individuals possessing those skills, and would typically need to be purchased if not provided by donation'. The charging of a subsidised audit fee would seem to fit within such a recognition rule.

[42] The final stage of the research process was to obtain some feedback directly from charity auditors. An executive summary and an earlier draft of this paper were sent out to a small sample of leading charity auditors for their comments. Seven copies were sent out and, although only three replies were received, these provided several useful insights and additions to the paper.

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The management of strategic exchange risk: evidence from corporate practices

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Abstract—Using a qualitative research methodology, this paper examines the responses of multinational companies (MNCs), their organisational structures, systems and managers to strategic exchange rate risk, a risk resulting from long-term movements in exchange rates. While strategic exchange risk has been categorised as the most important form of exchange rate risk in the academic literature, there appears to be a paucity of examples of the risk actually being managed in practice. This paper seeks to address this inconsistency. Findings from case study research suggest that contrary to results of prior research, companies *do* attempt to manage the risk, often aligning various organisational factors such as staff and systems to optimise the risk management process. The management of exchange rate risk as a whole appears to have been an evolutionary process with companies progressing gradually from the management of translation risk in the 1970s to that of transaction risk in the 1980s, and more recently to strategic exchange rate risk management.

1. Introduction

This paper reports the results of an empirical study into the corporate organisation and active management of strategic exchange rate risk.[1] Broadly speaking, strategic exchange risk is defined as the effect of long term movements in exchange rates on expected future cash flows of a company. Extending to cash flows that have not yet materialised, movements in exchange rates in the case of strategic exchange risk can actually alter the level of sales volume, prices and input costs; in other words, they can alter the level of cash flows of a firm (Dufey, 1972). This characteristic distinguishes strategic exchange rate risk from transaction and translation exchange risks, the other forms of exchange risk identified in the literature. While transaction and translation exchange risks are a result of the translation process of reported foreign cash flows and profits into parent currency terms, strategic exchange risk includes the consideration of the company's ability to actually generate these cash flows (and in turn profits) in light of currency movements.

The strategic exchange risk of a firm is a function of its strategic position in the market place; in particular, the international location of its key buyers, suppliers, plants and competitors is important (Lessard, 1989; Soenen and Madura, 1991; Miller and Reuer, 1998). In globalised industries,[2] firms

typically sell in a number of markets with different currency habitats, often in competition with firms whose cost structures differ from that of the company's along the currency dimension. Adverse movements in exchange rates may as a result create large misalignments between (i.) the company's cost structure and its revenue structure and/or (ii.) the company's cost structure and its competitors' cost structures (Dufey, 1972; Lessard, 1989). When quoted in a common currency, these currency movements will result in the level of costs of the company increasing as compared to its revenues in the former instance; and in the latter instance, they will increase as compared to the competitors' costs. In both instances, the competitive profile of the firm may alter considerably and result in a loss of market share and/or reduced profit margins.

In the light of its impact on the business profile of firms, strategic exchange rate risk has been unsurprisingly categorised as the most important form of exchange rate risk (Prahalad and Doz,

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The final version of this paper was accepted in May 2001.

[1] Strategic exchange rate risk is also often referred to as economic exchange rate risk (see e.g. Moffett and Karlsen, 1994; Miller and Reuer, 1998). The term 'strategic' is adopted in this paper because responses to manage this risk are primarily of a strategic (or operating) nature.

[2] Globalised companies are those in which there is extensive cross-country trade among their subsidiaries and also between the companies and their customers and suppliers (Porter, 1986, Bartlett and Ghoshal, 1989). They can be distinguished from the multidomestic companies of the pre-1970s in which foreign subsidiaries largely operated as autonomous units, selling and adding value to products locally (Porter, 1986). As a result, suppliers and customers were largely local and there was little, if any, interaction between the subsidiaries. International capital flows then were generally restricted to dividend repatriations to the parent firms (Lessard, 1989).

1987; Belk and Glaum, 1990; George and Schroth, 1991, Johnson and Soenen 1994; Miller and Reuer, 1998). Empirical studies reporting how MNCs manage strategic exchange risk are, however, surprisingly limited; translation and transaction risk management has received most attention (see e.g. Davis et al. 1991; Dolde, 1995; Hakkarainen et al. 1998; Makar et al. 1999). What is even more compelling, is that despite the prevalence of this risk in MNCs as reported in recent studies (Belk and Edelshain, 1997; Miller and Reuer, 1998), research to date suggests that corporate management practices are inconsistent with the prescriptive literature (Lessard and Nohria, 1989; Belk and Glaum, 1990; and Belk and Edelshain, 1997).

This study seeks to fill the gap in the existing literature; it seeks to ascertain reasons for the apparent inconsistency between academic theory and corporate reality in the management of strategic exchange risk. Drawing from an interdisciplinary literature review, it investigates not only the risk management strategies employed by MNCs, but also examines three key organisational variables, namely structure, staff and performance evaluation systems, that authors in the strategy literature (Peters and Waterman, 1982; Galbraith and Kazanjian, 1986) contend, are associated with optimising the management process.

In contrast to the results of previous research, this study finds that MNCs are consciously seeking to manage their strategic exchange risk, making various operational adjustments to offset the adverse effects of long term movements in exchange rates. Finance or planning departments appear to lead the process, educating and co-ordinating between the different operational departments as appropriate and also aligning performance evaluation systems to ensure managerial congruence with corporate objectives. There are, nonetheless, limitations to the extent to which firms can pursue their strategic exchange risk management strategies, owing to the various organisational and environmental constraints imposed upon them.

The remainder of this paper is organised as follows. The next section reviews previous literature. Section 3 makes a case for the qualitative approach used in the study and also describes the methodology adopted. Section 4 presents the empirical results and is followed by a discussion and conclusions.

2. Literature review
As noted above, strategic exchange rate risk is a function of the misalignment between the currency mix of a company's cost structure and its revenue structure and/or its competitors' cost structures. Operational adjustments such as procurement and marketing mix changes, with which the currency mix of costs and revenues can be altered to optimise the misalignments and as a result

accommodate the movements in exchange rates, are required to manage strategic exchange risk (Pringl, 1990; Lessard and Nohria, 1989). An exporting company may, for example, seek to source some of its input materials from the foreign markets it sells in. Consequently, the reduction in the level of revenue from these markets as a result of a home currency revaluation will be offset by a corresponding reduction in the level of operating costs. Alternatively, the firm may alter the nature of its product or selling strategy or even approach new, less competitive markets to influence its overall volume of sales (Soenen, 1991). Other operating strategies include production rationalisation strategies to absorb the adverse effects of strategic exchange risk and setting up new manufacturing facilities or relocating production within existing facilities to align the currency cost structure of a firm with that of its revenues (or competitors' cost structures). On the financial side, companies have a choice regarding the currencies of their core financial activities; the currency portfolio of debt should also be designed to manage the cost and revenue misalignments (Srinivasulu, 1981).

Capel (1997) applied the notion of real options[3] to the context of strategic exchange rate risk; the author proposed that companies should invest in flexibility in operational activities such as purchasing and production (as identified above), since it allows them to offset any downside effects of adverse movements in exchange rates while retain the upside potential of any favourable movements. With regards to the exporting company's situation mentioned above, for example, the firm could mitigate the downside effects of home currency revaluation by sourcing from foreign suppliers while reaping the benefits of an undervalued currency by retaining the local suppliers, so long as the firm has in place the flexibility and resulting infrastructure, to move between local and foreign suppliers.

Notwithstanding the innovative and sophisticated nature of currency risk management instruments, financial hedging can do little to protect firms from strategic exchange risk and can indeed become counter productive (see e.g., Pringl, 1990; Soenen, 1991; Capel, 1997). Hedging foreign currency denominated cash flows consistently with financial instruments, for example, will do little to eliminate the effects of long term movements in exchange rates since the hedge rates attained will themselves reflect these trends of the foreign exchange markets (Srinivasulu, 1981; Soenen, 1991). Consequently, financial hedging is only a *short-term* solution.

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[3] Real options are concerned with investment in the operational activities of firms, in various forms, so as to make available to the firms, various operational options from which it can choose when particular market conditions materialise.

Examining the strategic exchange risk management practices of UK MNCs, previous studies (Belk and Glaum, 1990; Belk and Edelshain, 1997), however, have found that corporate risk management strategies often only comprise financial instruments and operational measures are less preferred, if at all. Belk and Glaum (1990, p.7), for example, reported 'that none of the companies interviewed used any means of managing [strategic] exchange risk other than financial means'. The authors noted that the management of strategic risk was often closely linked to that of transaction risk; companies tended to forecast future cash flows and then use financial instruments to hedge these flows. Reporting on US corporate practices, Lessard and Nohria (1989) also noted that management at most firms assumed that the appropriate responses to the management of strategic exchange risk were financial, and that 'good' treasury management obviated the need for a broader, operational response. In only a minority of firms could corporate managers articulate a view that included both operational and financial responses and appropriate co-ordination between them to manage the risk.

With regards to the organisational design factors, much of the existing literature in finance has focused on the management of transaction and translation risk; there is little in these areas in the context of strategic exchange risk, both conceptually and empirically. Staff and skill issues are, however, an exception. The consensus among finance academics is that strategic exchange rate risk cannot be managed within the realm of the traditional finance function (Cornell and Shapiro, 1983; Hekman, 1991; Jesswein et al. 1995). Operational level involvement is considered inherent to the management process since operational strategies are paramount to the success of this process. The degree of operational level involvement, however, has been subject to some debate. Cornell and Shapiro (1983, p30.) among other authors argued that the '... main burden of [strategic] exchange risk management must fall on the shoulders of the marketing and production executives ...' since long term movements in exchange rates affect directly the level of sales and costs. Financial personnel, they added, should only be involved to the extent that they attempt to cope with 'some residual strategic risk'. In contrast, Hekman (1991) expressed a less extreme view. While she agreed that the management of strategic risk should reside with the operational departments, she proposed that treasury personnel should act as internal consultants to these departments since expert advice from these foreign exchange managers would allow them to manage the effects more competently. These hypotheses, however, have not been tested empirically.

With regards to the organisational configuration of the exchange risk management function, researchers in finance have reinforced their support towards centralisation (see in Belk and Glaum, 1990 and Davis et al. 1991) despite the decentralising trends of other multinational activity, as reflected in the decentralised and transnational forms of organisation (Bartlett and Ghoshal, 1989).[4] Centralisation with regards to currency risk has been associated with the opportunity to offset opposing subsidiary exposures, benefit from economies of scale in financial markets resulting from large, centrally aggregated exposures and also from specialist foreign exchange knowledge at the central level. This notion of centralisation, it should be noted, supports primarily the management of transaction and translation risks. Benefits accrued from economies of scales and specialist knowledge, for example, result from the use of financial instruments – these tools, as explained above, are unsuited to the management of strategic exchange risk. Further, offsetting opposing subsidiary exposures, in the context of translation and transaction risks, is deemed reasonable because it avoids the duplication of resources in the external financial markets at the corporate level without compromising the performance of the subsidiaries.

The organisational configuration for the management of strategic exchange risk, it is hypothesised here, is dependent upon the overall configuration of a MNC's activities. Because operational level involvement is central to the strategic exchange risk management process, this risk will have to be managed at the level at which these operational activities are based. Thus, in firms where overall operational responsibility is decentralised, the management of strategic exchange risk will have to be decentralised.

Much of the conceptual and empirical research into the performance evaluation systems to support the risk management process has also focused on transaction and translation risk (Lessard and Lorange, 1977; Cooper and Franks, 1987; Demirag and De Fuentes, 1999). Appropriate strategies with which to evaluate foreign subsidiary performance has, for example, been a popular area of research. The topical theme here has been to determine the preferred currency, the parent currency or the local currency, for evaluation purposes; in other words whether to include the translation aspects of ex-

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[4] In decentralised firms, Bartlett and Ghoshal (1989) reported that the entire strategy process rests with the subsidiaries to ensure that distinctive consumer tastes and legislation are met and managerial motivation is maintained amongst other issues. In transnational firms on the other hand, while subsidiaries are central to the implementation of the strategy process, senior level involvement is considered imperative to facilitate interaction and interdependence between subsidiaries so as to benefit from scale economies and diffusion of knowledge.

change risk in the performance evaluation systems (Demirag and De Fuentes, 1999).

Extending the work of Lessard and Lorange (1977), Lessard and Sharp (1984) looked at the evaluation of managerial performance in the context of strategic exchange rate risk. The authors proposed that companies should prepare contingent budgets to accommodate the effects of strategic exchange risk and corporate responses to this risk for a range of possible exchange rates. At the end of the year when the exchange rate is known, actual performance can be measured against the appropriate contingent plan to monitor managerial performance. The authors explained that not only would such a strategy ensure that managers were held responsible only for the currency effects that could be controlled by them, but it would also serve to encourage them to look at strategic exchange risk as an issue at the outset. Again, there is little empirical research in this area.

Overall, in view of the significance of strategic exchange rate risk for business performance, reflected in its ability to alter the competitive profile of a firm, the inconsistency between corporate risk management practices and academic theory as observed by previous researchers is cause for concern for multinational financial management. Further, acknowledging the views of authors in the strategy literature (Peters and Waterman, 1982 and Galbraith and Kazanjian, 1986), organisational design factors such as staff and systems are also an area of interest since they seek to optimise the risk management process. For example, appropriate performance evaluation systems have to be in place to ensure that organisational personnel work efficiently and in congruence with the objectives of the firm.

In this light, this paper explores the responses of UK listed MNCs into the corporate organisation and management of strategic exchange rate risk and the reasons for the particular practices.

3. Research methodology
The primary purpose of this research was to examine and explain the inconsistencies between the proposed and observed practices of strategic risk management and to explore issues surrounding the organisational configuration, staff and performance evaluation systems of the risk management process. The survey methodology was considered inappropriate for this purpose, in light of its inflexible nature for data collection purposes (Van Maanen, 1983; Eisenhardt, 1989). Semi-structured interviews with corporate personnel together with internal company documents and publicly available information formed the basis of the data collection process in this study. The interviews provided respondents the opportunity to volunteer information and explanations, thereby alerting re-

searchers to new issues not previously considered or new ways of thinking about the issues. Further, a qualitative research approach such as that employed here provides a basis for the establishment of understandings of the interpersonal and social construction of management decisions and actions in their own organisational settings (Tomkins and Groves, 1983; Hopwood, 1983; Ryan et al. 1990; Holland, 1998). These qualities were especially important in this study since various organisational actors were expected to be involved in the risk management process (Cornell and Shapiro, 1983; Hekman, 1991) and the constraints imposed by the organisational settings, both the internal configuration as well as the external context, often helped explain the inconsistencies as observed by previous researchers.

Previous literature was used as a guide for the data collection process. Where necessary, the authors deviated from themes and concepts presented in previous literature (see below). The study did not adopt the scientific approach whereby specific hypotheses were developed from previous literature and then tested rigorously from the findings of the empirical research.

Twelve large, listed MNCs were sampled, all of which, were likely to be confronted with the subtleties of strategic exchange rate risk. The choice of companies examined was not based on random selection; rather it was purposive, chosen to illustrate the issues of concern (Eisenhardt 1989, Kuzel 1992). The sample companies represented seven different industrial sectors; four belonged to the same industry, the automotive industry (see Appendix 1). Such a sample was considered useful to allow for some comparison of findings within a particular industry,[5] as well as that between different industries.

The choice of industries was guided primarily by the geographical structure of these industries. As apparent from the discussion in Section 1, strategic exchange rate risk is a function of a firm's strategic position in its market place; in particular, the international location of its key buyers, suppliers, plants and competitors. Using annual reports, specialist press and industry journals, the authors assessed, qualitatively, the international configuration of a number of firms' value chains and their industry structures to determine the extent to which these firms faced strategic exchange rate risk.[6] With re-

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[5] This aspect was considered particularly important because the competitive structure of the industry is instrumental to strategic exchange risk.

[6] Miller and Reuer (1998) have since also suggested that such an approach is useful to determine the extent to which firms are exposed to currency movements. With strategic exchange risk not necessarily having an immediate and directly visible impact on the financial performance of firms (unlike the other forms of exchange risk), it was difficult to measure the risk quantitatively in the study.

gards to the automotive industry, for example, the *International Motor Business* (1996) and *European Motor Business* (1996) and corporate annual reports all suggested that the industry is characterised with having a worldwide production, customer and supplier base. With such an extensive flow of high value goods across national borders, strategic exchange risk, arising from currency cost and revenue mismatches, together with the effects of foreign competition, was likely to be an inherent feature in this industry. Other manufacturing industries in the sample also exhibited characteristics similar to those of the automotive industry (see Appendix 1). Similarly, in the mining, oil and chemicals sectors there is a global market for the commodities sold, often traded in a hard currency such as the US dollar, and there are extraction sites worldwide.

Further, when seeking access into the firms, the researchers verified with the potential interviewees the extent to which their firms experienced strategic exchange risk. Together with ensuring that the sample firms met the criteria of the research, this approach also provided the researchers with an insight into managers' understanding of strategic exchange risk. All firms but one (Case 1), were concerned with currency cost and revenue mismatches and the competitive effects of currency movements. Case 1 belonged to the pharmaceutical industry. While this industry comprises various players based in the UK, the US and Germany, competitive effects of strategic exchange risk do not appear to be a significant issue for the firms because product prices are regulated by the national governments and there is sufficient product differentiation to preserve market share (on major products).[7] Consequently, Case 1 was unconcerned with the competitive effects of currency movements. The company was nonetheless included in the study since it experienced extensive currency cost and revenue mismatches; while its cost base, comprising largely research and development expenditure was sterling-based, revenues were generated globally.

Corporate treasurers, operating managers[8] and/or strategy personnel were interviewed at the twelve firms (Appendix 1). The first points of contact in the firms were the treasurers. Treasurers, having traditionally been held responsible for the management of financial risk, were expected to be involved in the management of strategic exchange rate risk (Belk and Glaum, 1990, Hekman, 1991). Operating managers including purchasers, marketers and general managers were also interviewed; initial contacts with them were derived largely through the treasury departments. With strategic exchange rate risk threatening sales volumes, prices and input costs and with operational based strategies designed to manage this risk, these man-

agers were expected to be interested and involved in the management process (Soenen and Madura, 1991; Cornell and Shapiro, 1983 and Hekman, 1991). In four companies, interviews with the treasury personnel revealed that the strategy or the risk management departments were actively involved with the management of strategic exchange risk; following the fluid approach of the research, these individuals were also interviewed.

Confidential case studies were prepared from the interviews with the senior management. While this confidentiality limits the reader's ability to appreciate fully the case in its complete organisational context, it was unavoidable in this instance.[9] Data collected was analysed largely using procedures set out by Yin (1994) and Miles et al. (1994). These procedures included the transcription of tape-recorded interviews, familiarisation of the cases, reflection on and analysis of the contents, coding, and finally linking. Further, at the analysis stage, the various case studies prepared were compared to develop common themes and relationships underlying the risk management process.

It is important to acknowledge the weaknesses of this study. First, with the relatively small sample size and the fact that the firms were not chosen at random, the findings of this study need to be viewed cautiously; they are more suggestive of possible corporate practices than they are confirming. At the same time, however, it is perhaps worth noting that there is little potential for generalisation of the strategic exchange risk management process, since the organisational context of firms, both the wider environmental context and the internal corporate context influence this process considerably. Other weaknesses stem from the fact that it was not possible to interview all the relevant personnel in some companies (e.g. company case 12) and consequently these cases were less detailed than others. Moreover, most of the interviews were only conducted in the UK. Consequently, in non-British firms, it was not always possible attain the views of senior management and in turn the analysis here is restricted to views from the subsidiary level.

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[7] Lewent and Kearney (1990) and Moffett and Karlsen (1994) also reported that competitive effects of movements in exchange rates were not significant for Merck plc (also a pharmaceutical organisation) for the same reasons.

[8] The generic term 'managers' has been used in the paper; exact titles of the persons interviewed varied. For example, the purchasing category included an analyst, director and manager.

[9] To resolve this issue, in part at least, Appendix 1 discloses the various firm and industry characteristics that may have affected the extent to which the firms experienced strategic exchange rate risk.

4. Results

This section reports the findings of the empirical study. In particular, it looks at the strategies adopted by firms to manage strategic exchange risk, and the organisational structure, staff and performance evaluation systems surrounding the overall risk management process. Together with acknowledging the presence of strategic exchange rate risk, all firms in the sample also sought to manage this risk. These firms also managed their transaction exchange rate risks and consistent with prior research (Belk and Glaum, 1990), the general view prevalent here was that there was sufficient risk within the core businesses that the firms operated in, without taking on the additional risk from movements in exchange rates.

In general, the sample firms had a conservative approach to the management of their strategic exchange rate risk; their priority was to the manage the adverse, loss-making effects of the risk, effects that would otherwise render them less competitive in their market place. Firms were unwilling to use favourable movements in exchange rates as a basis for improving their competitive market position through product price cutting strategies where such opportunities were available. Currency movements were considered too uncertain for such medium- to long-term strategies and consequently, the firms took the benefits from such movements as an improvement in profit margins.[10] Overall, consistent with prior research, the firms exhibited an aversion to strategic exchange risk. The form of aversion exhibited, downside aversion, however, is distinguishable from the general aversion to risk, as seen in instances of transaction exchange risk (Belk and Glaum, 1990), whereby risk management entails reduction in the overall variability of the cash flows.[11]

4.1. Risk management strategies

This section reports the results of the MNCs' use of operational adjustments to manage their strategic exchange risks as discussed earlier within the theoretical background of the study.

First, in contrast to the findings of previous

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[10] When case firm 12 had entered a new foreign market, it had pursued a low product pricing strategy and had used the favourable exchange rate at the time to help sustain this strategy. This strategy, however, was part of its overall promotional campaign and had only been a short term tactic.

[11] There were instances when the distinction between downside risk aversion and general risk aversion became blurred in actual practice. For example, case company 10, a mining company, used the currency denomination of debt (operational measures, as will be made apparent later, were unavailable to the firm) to manage its downside exchange risk. In doing so, the firm also forewent potential for any upside gains arising from any favourable movements in exchange rates because of the long term nature of the strategy employed. The net effect, in this instance, was an overall reduction in volatility as caused by exchange rates.

studies (Belk and Glaum, 1990, Belk and Edelshain, 1995), almost all companies in the sample agreed that financial hedges served as shorter-term solutions, while 'physical' hedges were more appropriate to manage the companies' longer-term strategic exchange risks:

'... hedging is encouraged only as a short-term solution ...'

(treasurer, case company 11,
vehicle manufacturer)

'... whatever you can do with financial instruments is only short term ... physical hedges are better, you have to consider business actions such as altering purchasing strategies, getting better products ...'

(senior treasurer, case company 3,
chemical company)

In addition, an internal document at one company read:

'... [overall] foreign exchange is one of the many issues that needs to be considered when determining the markets it [a company subsidiary] will focus upon, how it will sell in these markets, and also where it sources from ... sometimes also where it manufacture the products ... and we do this ... we have to ...'

(internal company document, case
company 12, a multi-product MNC)

In other words, operating issues such as sourcing patterns appeared to rest at least in part on currency considerations.

Marketing strategies, production rationalisation strategies, production relocation strategies and sourcing adjustments were amongst the operational measures used by the sample firms; while sourcing adjustments dominated in practice, the former were apparent less frequently. None of the sample firms had set up new production facilities in an attempt to mitigate their exposure to long-term movements in exchange rates, as suggested in the literature.

Use of marketing adjustments in the sample firms was limited. Only one company, case company 5, for example, had adjusted its prices in response to a movement in exchange rates. Similarly, only one company, case company 4, had managed to alter its market focus prominently from one country to another; having experienced reduced profit margins from sales in its US market as a result of a falling US dollar, this company had shifted its market focus to Japan, a 'promising new market' and one with a relatively strong currency. In essence, both these strategies here had served to improve the sales revenues for the firms in order to make up for the adverse effects of currency movements.

With regards to pricing adjustments, other man-

ufacturing firms in the sample explained that the competitive nature of the markets in which they operated (Appendix 1) restricted the flexibility of such adjustments; firms feared a loss of market share to competitors, in response to any product price increases. The industry characteristics in the case of the primary industry firms, also disallowed these firms from using the pricing strategy as a risk management tool; the oil and mining firms sold their products through commodity exchanges, and were in essence price takers with no opportunity to alter product prices. In the case of establishing new sales markets to manage the adverse currency effects, sample firms explained that they, together with their competitors, already operated on a global basis and consequently they had little opportunity to explore new markets; where possible firms, at best, attempted to shift focus within their existing sales markets to reduce some adverse currency effects. Again, selling through traded exchanges, firms operating in the primary sector had little choice as to the markets that they approached for sales.

Sample companies also used production rationalisation strategies as part of their overall strategic exchange risk management process in an attempt to absorb more easily the adverse effects of movements in exchange rates, in the event that other strategies were deemed less feasible or insufficient. Case company 9, a British steel exporter, for example, had announced plans to reduce its British labour force by 10,000 in response to the strengthening of UK sterling, which affected its export sales negatively. Consistent with findings of Grant (1985), in another instance, management at an automotive firm, introduced specialist continuous improvement programmes in an attempt to improve its own productivity as well as that of its suppliers. As Srinivasulu (1981) pointed out, while efficiency strategies can be established without taking currency fluctuations into consideration, currency risks provide an added impetus to bring into effect such measures.

Management at some manufacturing firms (e.g. case companies 3 and 12), also switched production between existing manufacturing locations to mitigate the adverse effects of strategic exchange rate risk by moving their currency cost structure from countries with overvalued currencies to those with undervalued currencies. Subsidiaries at case company 3, a chemical MNC, it became apparent were grouped together on the basis of the product types(s) that they sold, and each of these product types was headed by its own senior management team. Following the strengthening of UK sterling in the latter part of the 1990s, management at a chemical plant in the UK had reported to senior management the potential effects of this movement on the plant's profitability. Senior manage-

ment, in turn, had made arrangements to spread the production of the chemicals to other locations, taking into consideration spare capacity, transport costs, government levies etc.

Sourcing adjustments, however, dominated in practice, particularly in the manufacturing sector (the steel firm was an exception); companies used this parameter to offset adverse effects of exchange rate movements on both revenue and cost structures. In other words, they used this strategy to compensate reductions in sales revenues with corresponding reductions in purchase costs and also to avoid increases in purchase costs when exchange rates changed unfavourably.

Common use of the purchasing strategy is perhaps best explained by the fact that sourcing patterns are more flexible than other operational adjustments such as initiating new manufacturing facilities. Where long-term relationships with suppliers are not an issue, purchasing decisions generally offer an inherent flexibility to switch between suppliers without significant time lags. At the same time, real options in the form of identifying new suppliers and instituting new relationships can be established at costs lower than those associated with other strategies. In some of the sample firms, the set-up costs were further reduced because owing to the conservative nature of risk management process, these firms sought suppliers in countries in which they had established sales sites, since this would allow them to match directly the currencies of the costs with those of their revenues.

With regards to purchasing strategies, several new notions were observed among the sample firms. Within the automotive industry, for example, the problem of currency risk was so well integrated with purchasing decisions, that management even applied it to components that were traditionally manufactured within the corporate entity. While internally generated materials were generally cheaper than external sourcing, management had realised that, on occasion, when exchange rates had moved significantly, the former offered less favourable prices. Here as one of the purchasing manager's commented:

'...in-house production is essentially treated as a supplier and is in direct competition with the other suppliers ... the only difference is that it operates as a cost centre and does therefore not have a profit margin ...'

(purchasing director, case company 8, vehicle manufacturer)

The typical make/buy decisions in management accounting were extended here to include the currency dimension; while the firms retained their facilities to manufacture components internally, they also approved of external suppliers in the event

that they were more desirable.

While many purchasing decisions allowed for considerable flexibility, there were instances, particularly in the automotive and the automotive-related firms, where the firms pursued long-term relationships with some of their suppliers for reasons such as technological dependence and joint innovations. Some managers had negotiated 'risk-sharing' agreements with their counterparts; effects of movements in exchange rates, in this instance, were shared between the two counterparties. At case company 8, an automotive company for example, a supplier, with input from the firm itself, had developed some parts specifically for the firm, for one its product lines. In turn, case company 8 had agreed to source the parts from this particular supplier for a specific time period. With global assembly and sales sites, however, exchange rate movements became an issue for the firm; in some instances, adverse movements in exchange rates had the potential to make the parts for some sales sites more expensive than that from other possible suppliers. To manage this situation, the firm and the supplier, both dependent on each other, had agreed to share effects of any currency movements. In the other manufacturing companies (pharmaceutical, case company 1 and multiproduct, case company 12, for example), there was little dependence between the firms and their suppliers and, consequently, managers at these firms simply moved from one source to another to control the strategic effects of exchange rate risk.

Managers in firms that pursued long-term relationships with their suppliers also encouraged these suppliers to take actions that would reduce further their own risks to currency movements. Case company 2, for example, a British exporter, encountered a mismatch between its UK sterling cost structure and its competitors' US dollar cost structure and consequently suffered from the negative effects of strategic exchange risk when the UK sterling appreciated against the US dollar. To manage this misalignment, the firm sought to source from US suppliers. However, on several occasions, this strategy was not feasible as a result of long-term relationships with its British suppliers. In these circumstances, the company encouraged its British suppliers to source from US counterparts in order to minimise the misalignment. Payment systems in this case were adjusted such that case company 2 paid its British suppliers in US dollars for the materials that the latter purchased from the US, and in UK sterling for all other costs. In other words, the company pursued a 'dual-currency' payment policy. This system ensured that company 2's suppliers did not absorb the effects of movements in the US dollar / UK sterling rate, but rather, these effects were passed on to company 2 as warranted.

At only one manufacturing company, a vehicle manufacturer, did the exchange management function neglect the role of the purchasing department. Organisational politics, it appeared, was responsible for this occurrence. The treasury department believed that the purchasing department was driven more by personal achievement than by the global needs of the company and did not as a result encourage it to accommodate exchange rate effects through purchasing adjustments. In fact there was very little, if any, communication between the exchange risk management committee and purchasing department. Following the strengthening of its home currency, however, the chief executive of the company had announced at a press conference that the company would have to look to source globally in order to minimise the effects of the home currency revaluation on export sales. This, he added, was not of immediate concern to the company since it had secured more favourable exchange rates through its hedging programme for the next few months. The financial hedges had in essence served to buy some time for the firm, to allow it to make adjustments in the real, operating sphere.

As with the marketing strategies, there was one occasion when a sample manufacturing firm was unable to alter its purchasing strategy for risk management purposes due to the inherent inflexibility in this activity. At case company 9, the steel firm, much of the firm's input costs comprised metals purchased on global commodity exchanges and consequently, there was little opportunity here for resource relocation or resource substitution.

The mining, oil and pharmaceutical companies in the sample also exhibited situations of inherent inflexibility in their operational activities associated with input costs. Operating in the primary industries, much of the costs in the oil and mining companies originated at the extraction sites and owing to the nature of the industries there was little opportunity to change the geographical source of these costs or to choose the site locations in the first instance. In the case of the pharmaceutical company, as explained in Section 3, the firm experienced much of its risk as a result of a mismatch between its large UK sterling-based research and development cost structure and its global revenue structure. While in theoretical terms, relocation of the firm's the research and development unit to align the currency cost and revenue structures would have served to mitigate the firm's strategic exchange risk, in practice this was no real solution. The dramatic increases in costs of research and development, as Hout et al. (1982) and Kobrin (1991) have also reported, are amortised only through worldwide production and sales. As a result, regardless of the location of the cost base, a misalignment with the company's multiple currency revenue base was unavoidable.

As mentioned above, none of the firms in the sample had attempted to initiate new production facilities as part of their strategic exchange risk management programme. In general, the rewards, in the form of prevention of exchange related losses, from introducing such flexibility where possible, were not considered sufficient to justify the high capital outlays required. This was especially so because adverse movements in rates were generally not considered to be unidirectional and consequently the new flexibility was likely to be utilised only intermittently.

'...We would never put up a new manufacturing site to accommodate currency risks – we can't justify the costs. If we are looking at putting up a new site, currency rates and risks will be an issue, ... one of the issues to be considered in the decision making process.'

(treasurer, case company 11,
automotive company)

At the same time, however, as explained above, where multiple production locations were already in place, managers made use of the inherent flexibility. Moreover, as apparent from the quote above, firms agreed that were new location site decisions taking place, exchange risk issues would be incorporated into the decision making process. Two scenarios were observed here. In case firm 4, managers were looking to set up new facilities to meet high consumer demands; here with strategic exchange risk being one of the more critical issues for the firm, one of the site locations included in the decision making process was chosen for its ability to mitigate this currency risk. At a more subordinate level, exchange considerations were incorporated once various site locations had been established on other grounds such as favourable tax regimes. Thus while exchange risk related issues were unlikely to facilitate issues regarding new location sites because of high capital outlays, they were likely to be included in and influence the outcome of any on-going processes about such issues.

In conclusion, sample firms in this study sought to use operational measures to manage their strategic risks; usage of these strategies, however, was shaped significantly by the industry and/or business characteristics of these firms. Operating from traded commodity exchanges, case firms 7 and 10, for example, had little opportunity to make any marketing adjustments in an attempt to mitigate the adverse effects of exchange rates. At the same time, sourcing adjustments were only available to manufacturing companies where managers had the opportunity to switch between suppliers. Practices within this sector itself also differed to the extent that long term firm-supplier relationships for certain input parts pervaded in firms in the automotive and the automotive related industries. The need

for such relationships, in this instance, clearly took precedence over the need to manage corporate strategic exchange risk.

Where operational practices were restricted, firms were driven rely on what, in academic terms, are essentially imperfect financial hedges, geographical (currency) and product diversification, efficient manufacturing operations, and what one firm termed 'second order effects'; moreover, returns offered by firms to investors are perhaps reflective of the resulting, inherent exchange rate risks. Steel exporter, case company 9, encountered the second order effects. This British firm operated in a mature global environment and had little choice to alter its patterns of sales along the currency dimension because it experienced extensive competition in each of its markets from German (DM-based) competitors. With the revaluation of UK sterling against the German DM, the company experienced a reduction in profit margins as its German competitors lowered prices in the sales markets in sterling terms. However, a part of this reduction in profits, management explained, was compensated for by an increase in the level of sales because the industry's largest consumers, DM-based exporters gained a competitive advantage from the weakening of the DM and as a result increased their consumption of steel.

4.2. Organisational factors: staff and skills

As noted in Section 2, existing finance literature (Cornell and Shapiro, 1983, Hekman, 1991), contends that much of the responsibility for the management of strategic exchange risk should reside with the functional departments, and the treasury personnel should, at most, act as internal consultants to these departments for advise.

Findings from this empirical study, however, revealed that functional level management were often oblivious of the full implications of movements in exchange rates on operating performance, and their role in managing these effects. Following the devaluation of the Italian lira during the Exchange Rate Mechanism (ERM) crisis,[12] for example, the marketing department at case company 11 had failed to make any pricing adjustments to protect the resulting decrease in profit margins. It had believed that the treasury department was responsible for managing all movements in exchange rates:

'...[Previously] exchange rates were not our role, the finance department dealt with that...'

(marketing manager, case company 11,
vehicle manufacturer)

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[12] The Lira devalued by between 15%–20% during the ERM crisis. Case company 11 estimated that this devaluation cut its 'bottom line' profits by $1.3bn for the respective financial year.

The treasurer here also commented:

"Previously operational department went and made an operating or a business decision and the fall out was then left to us, the treasury to manage. Typically the operating management looked at the treasury to outweigh all the risk from currency movements..."

(treasurer, case company 11,
vehicle manufacturer)

The purchasing departments were also oblivious of their role in managing their companies' strategic exchange risks arising from export sales activities:

'...that's the sales side, we do not get involved ... they manage their own risks with the finance department ... in fact they are all part of a committee that takes actions to manage exchange risk ..'

(purchasing director, case company 6,
vehicle exporter)

While this attitude may have resulted from organisational politics (as explained above in Section 4.1), a lack of understanding of exchange risk management on part of the purchasing community may also explain such a viewpoint. The latter was indeed evident in one British exporter. Sourcing locally from British suppliers, the purchasing director admitted that conventionally the purchasing group had failed to consider movements in exchange rate as an issue when making sourcing decisions, since these movements never impinged upon the financial performance of the department. Yet it was well equipped to accommodate the risks arising from the company's sales activities:

'... previously we did not look at US $ sourcing, we simply bought locally [UK]. It all only started after the review by the finance section...'

(purchasing director, case company 2,
automotive related)

Overall, purchasing departments of the case companies had, at best, only recognised the problem of exchange risk to the extent that it materialised for supplies that they purchased from foreign sources.

Treasury departments or strategic planning departments, the case studies revealed, facilitated the management of strategic exchange risk within companies. These groups tended to educate operating departments about the problem of exchange rate risk and their potential role in managing this risk. By analysing the total activities of the company, these departments were able to derive a comprehensive view of the currency profile of their respective companies' cost and revenue structures and in turn determine the overall level of risk. Subsequently, they co-ordinated management of the risk across the relevant departments.

While the role of the treasury department as co-ordinator of the process of strategic exchange risk management is perhaps to be expected, that of the strategy planning department in a similar capacity is novel. Case companies, nonetheless, justified it on several occasions. First, the strategy process promotes a long-term perspective that is fundamental to the management of strategic exchange risk. Consistent with previous research (Aggarwal and Soenen, 1989; Belk and Glaum, 1990; Belk and Edelshain, 1995), this study found that the treasury department, traditionally held responsible for the management of exchange rate movements, was often oriented towards the management of shorter term movements in exchange rates, neglecting, as a result, management of strategic exchange risk.

Second, strategic planners in some companies commented that evaluating and responding to the macroeconomic environment of businesses form core activities of the planning process and with movements in exchange rates forming part of this environment their effects are best accounted for in the planning process:

'... the issue of exchange rates is perhaps the second most important element that affects our business after sales ... it is therefore vital that we understand its implications and learn to manage it ...'

(planning department, case company 4,
vehicle manufacturer)

Finally, successful management of strategic exchange risk as seen above requires a holistic and co-ordinated response across the traditional business functions. Strategic planners usually operate with such a cross-functional brief. On matching internal capabilities with the external environment of companies, the planning department is responsible for co-ordinating all internal activities.

4.3. Organisational factors: structure

As explained in Section 2, while literature in finance has reinforced its support towards centralisation of the currency risk management function (see in Belk and Glaum, 1990 and Davis et al. 1991), benefits accrued from such a structure support the management of transaction and translation exchange risks and not that of strategic exchange risk. Consistent with the hypothesis developed in this paper, configuration for the management of strategic exchange risk followed suit of the overall structure of a firm.

Two different overall corporate structures were apparent amongst the sample firms: the decentralised form and the transnational form (as seen in Bartlett and Ghoshal, 1989). In the former case, subsidiaries operated as decentralised, autonomous units, and the strategic exchange man-

agement process here was predominantly decentralised; when sample firms operated on a transnational basis with much of the key operating functions located at the central level, only part of the process was decentralised.

The former phenomenon, companies explained, was inevitable since the information required to assess the level of risk was available only at the subsidiary levels:

'... There are no prescriptions that can come out of the centre to assess the degree of risk ... you need to do an in-depth analysis of your business to know what your real exposures are ... we can't do that sitting in the ivory tower here ... the only people who can are the businesses themselves [since] they are closest to the strategic factors that affect them; only they can identify and analyse these factors...'

<div style="text-align: right">(treasurer, case company 12,
multi-product company)</div>

Further, strategies required to manage the companies' risks tended to be under the direct control of the decentralised operating units:

'...business units are empowered to do it [manage the risk] themselves ... this is because the element of currency management cannot be isolated from other important issues that decentralised units are concerned with. The market in which a company operates in, or sources, from cannot, for example, be isolated from other business issues...'

<div style="text-align: right">(foreign exchange manager, case
company 3, chemical industry)</div>

The central treasury had nonetheless been involved in the management process in several companies; as mentioned in the previous subsection (Section 4.2), treasury departments were sometimes involved in facilitating the management of strategic exchange risk within companies. Frustrated with the knowledge that subsidiaries did little to manage their strategic exchange risks, treasury departments at these companies had initiated training programmes for their subsidiaries. Aimed at the financial personnel, the programmes sought to highlight to the subsidiaries the limitations of financial hedging and the need to make 'physical internal' hedges to manage the risk. Financial personnel were in turn expected to educate the functional community at the subsidiary level about currency issues.

Transnational firms in the sample tended to concentrate only in single industries. The subsidiaries here were generally responsible for executing prescriptions provided by the operating functions, such as procurement and sales located at the central level. Information relevant for most business issues was assimilated and analysed at the central

level in these firms. Currency risk management formed one of these issues and consequently the decision making stage was centralised while the implementation stage, decentralised.

4.4. Organisational factors: performance evaluation systems

One of the most important and potent components of organisation is the mechanism by which performance is measured and evaluated (Galbraith and Kazanjian, 1986), especially when internal complexity increases and the delegation of authority is no longer confined to a single party. These systems serve to control managerial action and also encourage employees to work towards the goals of the organisation. Performance evaluation issues regarding the management of strategic exchange risk have been somewhat neglected in the literature, although Lessard and Sharp (1984) is a notable exception.

The research here revealed that the evaluation of the risk management practices and therefore that of the managers of the process proved difficult for the case firms on two accounts. First, as compared to the evaluation of the management other forms of exchange rate risk (e.g. transaction risk), there were no definitive yardsticks against which companies could judge themselves:

'...while transaction risk management strategies can be benchmarked against a hedge everything or hedge nothing (benchmark), such a policy is not valid here [for strategic exchange risk management]...'

<div style="text-align: right">(assistant treasurer, case company 12,
multi-product MNC)</div>

Companies could not compare the results of practices that they pursued with other potential risk management practices because the outcome of the latter was simply unknown.

Second, given that operational adjustments were central to the risk management process, performance of these strategies in terms of managing strategic exchange rate risk could not be differentiated from their performance in terms of other core activities within the companies. As a result, management within companies tended to rely on the notion that their risk management concepts were justified, because they were theoretically sound and they used the overall performance of their companies as a proxy for risk management performance.

Lessard and Sharp (1984) had suggested that firms should prepare contingent budgets for a series of different exchange rates, and when a particular rate materialised, managers could be benchmarked against the corresponding budget. Such a strategy would have served to address the difficulties of benchmarks and operating management

performance as posed by managers in the current study. When questioned about the applicability of Lessard and Sharp's (1984) strategy in practice, the common response from the interviewees is summed by one manager's comment:

'...That would be hard ... we'd spend all our time just making these plans ... when would we implement them and assess performance ... and of course we can then argue that we should prepare such plans for all other uncertainties that may affect us ... exchange rate movements ... are only one of these ...'

(strategist, case company 11, vehicle manufacturer)

To ensure that the operating managers and treasury personnel took responsibility of their roles in managing the risk, two different, rather informal, practices were identified. First, some companies, particularly in which purchasing adjustments dominated, formally included the notion of strategic exchange risk management as part of their documented purchasing policies. Thus, when purchasers made any commitments, they were likely to have considered strategic exchange risk as one of the key issues as part of the purchasing strategy. Second, in three companies, liaison officers between the operating and finance departments and/or senior management monitored operational activities to ensure that they actively considered the issue of long term exchange rates movements when making any significant decisions.

A further issue relating to performance evaluation, that emanated from the research, was that companies often adjusted the conventional measures with which they evaluated the performance of subsidiaries and operational departments, as otherwise these measures impeded the management of strategic exchange risk with reference to specific strategies. When companies sought to migrate between production locations to manage the risk, for example, conventional measures (such as budgets and comparisons of results between subsidiaries) became inappropriate tools. They were likely to penalise the subsidiary from which production was transferred for under-performing as compared to its counterpart to which production was migrated. Qualitative measures with which senior level management reviewed such circumstances qualitatively supplemented the conventional quantitative measures.

Further, in instances when in-house component manufacturers were superseded by external suppliers (for reasons of strategic exchange risk management), they had the opportunity to defend themselves:

'...we have the chance to defend ourselves ... if we do not manufacture [because it is cheaper to source from a country with favourable exchange rates], then we can put forward our case .... and we do not get penalised ...'

(component manufacturing manager, case company 8, vehicle manufacturer)

5. Implications and conclusions
Using a qualitative, case study based research approach, this paper examined the corporate organisation and management of strategic exchange rate risk. Strategic exchange risk represents one of the many special complications that MNCs are confronted with in the current era of globalisation coupled with macroeconomic turbulence. Findings of and conclusions from this study must be viewed with caution in view of the relatively small sample size and purposive selection of the firms in the study. Further research to confirm these conclusions is required. Moreover, a cross-country comparative study would be useful to ascertain whether there is significant inter-country consistency in the results as that suggested here.

Consistent with the prescriptive literature (Pringl, 1990, Soenen, 1991), the corporate managers interviewed in the sample generally articulated a view that while financial instruments served to manage the shorter term volatility of exchange rates, long term risk management required strategic, operational measures. While these findings are inconsistent with those of previous studies (Lessard and Nohria, 1989; Belk and Glaum, 1990; Belk and Edelshain, 1997), they suggest that MNCs are seeking to optimise their risk management practices. Sample firms' industry and business characteristics shaped much of their use of operational measures and in some instances managers were unable to execute particular operational strategies. The global nature of the sales markets, for example, restricted corporate use of marketing adjustments. Consequently, consistent with Miller (1998), where operational strategy is concerned, we cannot assume the one to one mapping between exposures and hedging instruments generally implied in finance research.

Evidence from the research suggests that the management of exchange rate risk has perhaps been an evolutionary process with companies having progressed gradually from the management of translation risk in the 1970s (Jilling, 1978) to transaction risk in the 1980s (Aggarwal and Soenen, 1989) and more recently to strategic exchange risk. On comparing the results of this study with those of previous studies, MNC risk management practices since the mid-1990s appear to have transformed, with strategic risk management now playing a significant role in the overall risk management process. This study also revealed that the ERM crisis of 1993 together with the strengthening of the UK sterling since the mid-1990s, had prompted three companies in the sample to ac-

knowledge and act on their strategic of exchange rate risk. For example, managers at case company 11 had initiated the strategic risk management process only after suffering a profit cut of US \$1.3bn from the Lira devaluation of 1993.

Difference in the findings of this study as compared to those of previous studies may also be explained by differences in the research design adopted. While the previous studies have focused largely on the treasury departments of MNCs; treasury personnel, (as this study demonstrated), may play a relatively inert role in the management of strategic exchange risk and may as a result lack a complete understanding of the process within companies. Moreover, the sample in this study was purposive, in that it comprised companies that were likely to experience strategic exchange risk. Companies in previous studies tended to have been selected randomly and as a result the samples could have included companies that experienced limited strategic exchange risk and, in turn, used limited operational risk management strategies. An examination of the extent to which MNCs experience strategic exchange risk together with the precise factors that influence the level of this risk as pursued by Miller and Reuer (1998) would serve to

develop further this facet of international financial management.

For those firms that have not yet acknowledged the relevance of strategic exchange risk, it is important to realise that the management of this risk deviates considerably from that of transaction risk, a risk that they are most familiar with (Aggarwal and Soenen, 1989). Together with differences in the actual risk management strategies, as established by participants of this study, there are notable differences in the design of the organisational variables instrumental to the risk management process. While the centralised form of organisational structure is favoured for the management of transaction risk, for example, 'semi-centralised' or perhaps even decentralised forms may be the optimal configurations for the management of strategic exchange risk.

Further, the management of strategic exchange risk, vis-à-vis that of transaction risk, is an activity that requires information, expertise, co-ordination and implementation actions that span across the multiple business departments within a company. This in turn has implications for how the risk management process itself and managers of the process can be evaluated to ensure goal congruence within the organisations.
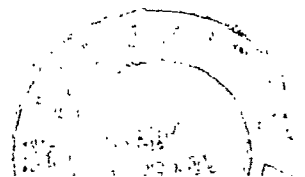
Appendix 1
Case details

Case	Industry	Rank range	Foreign involvement[1]	Business characteristics	Length (hrs)	Period month/year	Interviewees
1	Pharmaceuticals (UK)[2]	Top 100	92.99	global sales market, localised costs (R&D); (extensive international competition did not affect the firm's extent of strategic exchange risk)	4.5	8/97	Treasurer, purchaser, marketer, financial controller
2	Automotive related (UK)	Top 100	89.16	global sales market; industry largely led by US competitors; significant local manufacturing costs	5	6,7/97	Treasurer, assistant treasurer, purchaser, marketer, strategist
3	Chemicals (UK)	Top 100	80.95	global sales market and competitors; highly competitive; multiple manufacturing bases; significant proportion of materials sought from global commodities markets	3.5	9/97	Treasurer, foreign exchange manager, general manager (subsidiary)
4	Automotive	Top 100	73.68	international sales of luxury products, although US market dominated; highly competitive; significant local manufacturing costs	5	6/97	Treasurer, strategic planner, marketer, purchaser
5	Chemicals	100–250	72.06	global sales market and competitors; highly competitive; multiple manufacturing bases; significant proportion of materials sought from global commodities markets	3	12/97	Treasurer, general manager (subsidiary), marketer
6	Automotive	100–250	71.13	global sales, purchases, and competitors; a highly competitive market; considerable local manufacturing costs	3.5	5/97	Treasurer, marketer, purchaser
7	Oil	Top 100	66.74	global sales market and competitors; highly competitive; multiple extraction sites	3.25	1/98	Treasurer, general manager (subsidiary)
8	Automotive	100–250	65.18	global sales, purchases, and competitors; multiple manufacturing and assembling sites	4	6/97	Treasurer, purchaser, component manufacturing manager
9	Steel (UK)	100–250	56.67	global sales and purchases; a highly competitive market; dominant competitors: German firms	3.5	8/97	Treasurer, accounts manager, purchaser
10	Mining	Top 100	54.21	global sales and competitors; extensive competition; multiple extraction sites	4.5	1/98	Treasurer, assistant treasurer, risk manager
11	Automotive	Top 100	33.13	considerable global sales but more concentrated locally; extensive international competition in both local and international markets	4	5/97	Treasurer, marketing, purchasing, strategist
12	Multiproduct (US)	100–250	32.43	global sales, purchases and competition	2.5	8/97	Treasurer, general manager (subsidiary)

Interview data

[1] Calculated as a percentage of foreign sales / total sales   [2] Where the parent country of the firm together with the industry that it operates in is likely to identify the firm, the former has been omitted.

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The characteristics of firms subject to adverse rulings by the Financial Reporting Review Panel

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Abstract—This study presents evidence on the characteristics of firms judged by the Financial Reporting Review Panel (FRRP) as having published defective financial statements. Relative to a pairwise-matched control sample, FRRP firms are associated with weak performance in the defect year. In contrast, their performance in the post-defect period is indistinguishable from that of the control sample, suggesting that rather than being perennial underachievers, FRRP firms are average performers suffering temporary performance difficulties. FRRP firms are also less likely to have a Big Five auditor. Weaker evidence is also presented that FRRP firms are less likely to have an audit committee and a high proportion of outside directors. In contrast, their remaining governance characteristics are largely indistinguishable from those of the control sample. Moreover, there is no evidence that public censure by the FRRP leads to a higher incidence of executive turnover in subsequent years.

1. Introduction

The agency responsible for enforcing accounting standards in the UK is the Financial Reporting Review Panel (FRRP). It is responsible for reviewing apparent departures from the accounting requirements of the Companies Act and forcing remedial action where the financial statements in question are deemed to be defective. Prior research suggests that the FRRP is perceived to have had a positive impact on the quality of financial reporting in the UK since it began operations in 1991 (Hines et al., 2001; Beattie et al., 1997; Jack, 1994). Yet little work has been conducted on the characteristics of firms whose published financial statements have been judged by the FRRP to be defective.[1,2]

This paper compares firms whose financial re-

ports were publicly censured by the FRRP between January 1992 and May 1999 to a size-, industry- and time-matched control sample of non-censured firms. Our findings can be summarised as follows. FRRP firms are characterised by significantly poorer performance during the period in which the defective financial statements were issued. The relative weak financial condition of FRRP firms is manifested in a number of ways. They have a higher frequency of losses and earnings decreases, higher leverage, a lower frequency of dividend increases, greater restructuring activity, and fewer optimistic management forecasts for the year ahead. Further tests, however, reveal that the performance difficulties experienced by the FRRP sample are largely confined to the defect year. In particular, their earnings performance is generally indistinguishable from that of the control sample in the years adjacent to the violation year. In contrast to results reported by Dechow et al. (1996) for the US, we find no evidence that these instances of defective financial reporting are motivated by a desire to obtain low cost external finance.

Our tests also examine the characteristics of certain control mechanisms that firms might be ex-

* The authors are at the University of Lancaster. They are grateful for helpful suggestions from Mary Bath, Philip Brown, Mark Clatworthy, Stella Fearnley, Pelham Gore, Clive Lennox, Peter Moizer, Norman Strong, Richard Taffler, two anonymous referees, and seminar participants at Feng Chia University, Katholieke Universiteit Leuven, London Business School, Oxford, Warwick, the AAA-BAA Second Globalisation Conference 2000, the Financial Reporting and Business Communication Conference 2000, the Asia Academic Accounting Association Inaugural Conference 2000, the British Accounting Association Annual Meeting 2000, and the 1999 Financial Accounting and Auditing Research Conference. Financial support was provided by the Nuffield Foundation, The Leverhulme Trust, the Economic and Social Research Council (contract #53627500497), and the European Commission (HARMONIA network project). Research assistance was provided by Jan Bornebusch and Amelia Hunt. Correspondence should be addressed to Dr S. Young, ICRA, The Management School, Lancaster University, Lancaster, LA1 4YX, UK, Tel: (+44)-1524-594242, Fax: (+44)-1524-594334, Email: s.young@lancaster.ac.uk

[1] An exception is the study by Hines et al. (2001) that investigates the process leading to public censure by surveying the views of a sample of company directors and audit partners with first hand experience of the FRRP and its operations. However, Hines et al. (2001) do not attempt to assess, in any systematic way, the characteristics of FRRP firms and how they differ from firms that do not receive adverse rulings.

[2] We use such terms as 'censured', 'adverse ruling' and 'defective accounting' interchangeably when referring to FRRP cases in the remainder of the paper.

pected to employ to maintain the integrity of their financial statements. We find that FRRP firms are significantly less likely to have a Big Five auditor. Our multivariate tests also provide limited evidence that FRRP firms have weaker board structures, as reflected in a lower average proportion of outside (non-executive) directors and a lower tendency to form an audit committee. On the other hand, we find that neither the ownership structure nor the director profiles of the FRRP sample differ systematically from those of the control sample. Moreover, FRRP firms are significantly more likely to separate the roles of chairman and CEO. With respect to board turnover, we find no evidence that public censure for defective financial reporting imposes significant costs on incumbent managers in the form of increased dismissal rates. Finally, FRRP firms do not seek to strengthen their boards via the appointment of additional outside directors in the period following public censure. These findings suggest that the public revelation of defective financial reporting is not an event that causes firms to change their board structures.

Caution needs to be exercised when interpreting our results. For example, based on our findings it is tempting to conclude that poor performance is a key cause of defective financial reporting. However, to the extent that the firms initially referred to the FRRP for consideration represent only a sub-set of the total population of defective financial reporters, our study may simply be capturing aspects of the referral process. In particular, because the FRRP relies heavily on complaints from third parties to identify defective reporters, the observed link between poor performance and an adverse ruling may reflect higher detection (and hence referral) rates resulting from the increased scrutiny of published accounting data by disaffected stakeholders. Likewise, while our auditor type result is consistent with the view that weak monitoring structures increase the likelihood that managers will violate GAAP, other explanations are possible. For example, Hines et al. (2001), McBarnet and Whelan (1999) and Styles (1999) characterise the enforcement activities of the FRRP as a political process in which considerations other than those of a purely technical accounting nature influence the likelihood of an adverse ruling. In this context, the fact that the FRRP appears less likely to censure firms with Big Five auditors may simply reflect a preference for avoiding confrontation with the large audit firms because of a higher perceived risk of losing the case and the greater resources that Big Five firms can bring to bear to achieve a private settlement.

It should be noted that our study does not explicitly attempt to measure the costs (for auditors and their clients) associated with an adverse FRRP ruling; hence we are unable to shed further light on the reasons why firms and auditors might seek to avoid censure. Finally, it is important to recognise that our study considers only the first seven years of the FRRP's operations. Several authors hypothesise that attempts to establish its authority as an effective enforcement mechanism may have influenced the activities of the Panel during this initial timeframe (McBarnet and Whelan, 1999; Styles, 1999). To the extent that the Panel's censorship rulings made during this 'start-up' phase are not representative of its subsequent enforcement decisions, our findings may not necessarily form a reliable basis for predicting future FRRP cases.

Our results confirm many of the findings from the small but growing number of US studies that examine the characteristics of firms found to have issued defective financial statements. This is in spite of some important differences between the characteristics of our sample of UK firms and those that feature in US studies of poor or defective accounting. For example, the cases examined by Beasley (1996) and Agrawal et al. (1999) deal with instances of outright fraudulent financial reporting. For this and other reasons, the firms in most of the US studies tend to be small IPOs that have adopted aggressive earnings recognition and measurement methods. In the UK, firms engaging in fraudulent reporting would often fall within scope of the Theft Act 1978 and as such would not be the responsibility of the FRRP. Moreover, the average size of the firms in our FRRP sample is much larger than those in the US studies – the FRRP has not shrunk from censuring some of the country's major companies (e.g. British Gas plc) – and the accounting defects are generally much less serious. While it is tempting to conclude that the watchdog activities of the FRRP are having the desired of effect of promoting compliance with UK GAAP, such a conclusion would be premature because we lack knowledge of the effectiveness of the process by which instances of defective accounting are brought to the FRRP's attention. Furthermore, the confidentiality rules governing the operations of the FRRP leave us in the dark about the nature of the accounting issues it does not pursue.

The remainder of the paper is organised as follows. The next section provides further details of the FRRP and the financial reporting environment in which it operates. Section 3 outlines the motivation for the study and presents our empirical predictions. Section 4 describes our sample of FRRP cases and provides details of the research design. Section 5 presents a comparison of the characteristics of the FRRP and control samples, while Section 6 examines board turnover. Section 7 summarises our main findings and discusses their implications.

2. Institutional background

During the late '80s and early '90s a series of high profile financial scandals and unexpected corporate failures raised concerns about the integrity of UK financial reporting and the effectiveness of accounting regulation (Shah, 1996; Smith, 1992). In the absence of a formal mechanism for enforcing accounting standards, creative accounting was perceived to be widespread (Shah, 1996; Tweedie and Whittington, 1990) and while auditors, analysts, and the popular press partially constrained such activity, their impact appeared to be weak and inconsistent (Shah, 1998).

The FRRP began operations in mid-1991 as part of a fundamentally restructured accounting standards-setting system.[3] The FRRP is an enforcement agency whose role is to examine material departures from the accounting requirements of the Companies Act 1985 and applicable accounting standards. Its jurisdiction is restricted to companies' annual reports and its remit encompasses all public limited and large private companies.[4] The agency adopts a reactive approach to the detection of defective financial reporting in the sense that it does not routinely scrutinise company reports falling within its ambit. Instead, it relies heavily on complaints made by third parties to identify cases of defective accounting. The three primary sources of complaint that trigger an inves-

tigation are (i) a qualified audit report or disclosed non-compliance with accounting standards or other requirements, (ii) referral by an individual or a corporate body, and (iii) press comment. The FRRP never reveals the identity of the complainant, or in what context the complaint was made. Following referral, the Panel's investigations may address not only the original subject of the complaint but also any additional financial reporting issues that come to light during the review process.

In the event that the FRRP deems the accounting treatment under investigation not to be justified on the grounds of providing a true and fair view, remedial action is sought. This usually takes the form of either a revision or retrospective restatement of the published figures. In attempting to resolve cases requiring remedial action, the FRRP first seeks to persuade the firm in question to voluntarily accept the decision and institute the required corrective action. Failing that, the FRRP has the power to apply to the court for an order requiring the financial statements to be restated. In the event that the court upholds such a request, all legal costs, together with any reasonable expenses incurred by the firm in revising its accounts, must be borne by the directors who approved the defective statements (Companies Act 1989, s245B). In all cases to date, a voluntary solution has been agreed, although preparations for an application to the court have been at an advanced stage on several occasions. At the conclusion of a case where remedial action has been taken, the FRRP normally issues a public statement providing details of the case and the method of resolution.[5] In addition to simply reporting the details of a case, these public statements also play a wider role by providing information and guidance on contentious accounting treatments, often with the objective of deterring others (McBarnet and Whelan, 1999: 66). For those firms investigated by the FRRP but against which no action is brought, neither the details of cases nor the identity of firms are publicly disclosed.[6] The set of adverse public rulings issued by the FRRP therefore represents the only observable output of the whole process.

The way the FRRP identifies firms for investigation is similar to the approach adopted in the US by the Securities and Exchange Commission (see Feroz et al., 1991). However, the FRRP has fewer resources than the SEC and is therefore probably even more reliant on complaints from third parties, with the attendant biases this involves.[7] Furthermore, it is possible that considerations other than those of a purely technical accounting nature influence the likelihood of an adverse ruling by the FRRP. For example, some commentators have suggested that firm size is an important consideration in the FRRP's decision to issue an ad-

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[3] This restructured system saw the body previously charged with developing accounting standards, the Accounting Standards Committee, replaced by the Financial Reporting Council and its subsidiary bodies, the Accounting Standards Board, the Urgent Issues Task Force, and the FRRP. In addition, company law was also amended to give accounting standards statutory recognition for the first time. For a general synopsis of these changes in the regulation of UK financial reporting see Turley (1992). For a more detailed discussion of the specific role and activities of the FRRP, see McBarnet and Whelan (1999) and Brandt et al. (1997).

[4] That is, all firms not qualifying as small or medium-sized enterprises under section 247 of the Companies Act 1985.

[5] Neither Böckem (1998) nor Brandt et al. (1997) report any significant (p < 0.05) share price reaction to the announcement of an adverse ruling by the FRRP. This is not surprising, however, given that FRRP announcements are typically timed to coincide with the publication of confounding information such as interim statements, preliminary results announcements and earnings forecasts released by the companies themselves (McBarnet and Whelan, 1999: 51).

[6] Our own request to the FRRP to be granted confidential access to the names of such firms was politely but firmly declined.

[7] One of the main problems of reliance on complaints is that the motivation to 'blow the whistle' may be for reasons other than the simple desire to promote good accounting. For example, Butte Mining (press notice #43) were referred to the FRRP by Robertson Group who held a 4% stake in Butte at the time but who Butte were pursuing over a claim for £100m. McBarnet and Whelan (1999: 35) point out that another common situation producing referrals is a contested takeover. The FRRP is aware of such biases, however, and is extremely wary of being sucked into a hostile takeover battle (McBarnet and Whelan 1999: 36).

verse ruling because smaller firms represent 'softer' targets, in the sense that they are less likely to challenge the FRRP's decision (Brandt et al., 1997). On the other hand, the FRRP has also been accused of preferring to target large, high profile firms to enhance external perceptions of its work (Hines et al., 2001: 17). Not surprisingly, the FRRP has always been keen to dispel the notion that issues other than the significance of the accounting defect underlie its decision to issue an adverse ruling (McBarnet and Whelan, 1999: 79).

3. Motivation and research questions
3.1. Motivation
The majority of extant research on the FRRP directly examines its procedures and activities as a means of assessing its effectiveness as an enforcement mechanism and its resulting impact on the quality of UK financial reporting (Fearnley et al., 2000; Hines et al., 2001; Styles, 1999; Brandt et al., 1997). In contrast, this study adopts an alternative perspective insofar as it focuses exclusively on the outputs of the process (i.e., the set of firms censured by the Panel). Firms censured by the FRRP are potentially interesting for several reasons. First, to the extent that the reporting defects it identifies represent examples of poor accounting, an examination of censured firms may help to shed light on the drivers of low accounting quality. In the same way, Beneish (1999), Dechow et al. (1996), and Beasley (1996) use firms subject to SEC Enforcement Actions to investigate why and how US managers manipulate earnings. Publicly censured firms represent exogenously determined examples of low accounting quality and as such help to overcome the measurement problems that confound other more commonly used earnings management proxies (e.g., discretionary accruals).

Firms censured by the FRRP are also interesting

because they represent the only visible aspect of the enforcement process in the UK. As such, evidence on the characteristics of firms subject to adverse rulings may also provide a potentially important source of information concerning the way UK accounting standards are enforced. For example, evidence on the types of firms judged to have issued defective reports might shed light on the politics of enforcement.[8] It is important to recognise, however, that this aspect of the enforcement process also limits the inferences that can be drawn from studying such firms. In particular, these unobservable aspects of the FRRP's operations create potential selection biases, the result of which is that censured firms may not be representative of the population of defective reporters. Extant studies of SEC Enforcement Action firms face identical problems.[9] Accordingly, while systematic differences between censured and noncensured firms may be observed, the extent to which such differences reflect the causes of low accounting quality, as opposed to the politics of the censorship decision or the probability of referral, remain an open question.

3.2. Empirical predictions
Prior work has identified a number of factors that create incentives for managers to manipulate or violate GAAP. These include poor performance (Degeorge et al., 1999; Burgstahler and Dichev, 1997), high leverage (Watts and Zimmerman, 1986: 210–217), and the desire to raise equity finance at low cost (Dechow et al., 1996).[10] We label these factors 'financial motives' and predict that they will be positively associated with the incidence of defective financial reporting. We recognise, however, that these factors might also capture the increased probability of being referred to the FRRP for investigation. In particular, the financial statements of poorly performing firms, highly levered firms, and firms seeking to raise funds from the capital markets are likely to have been subject to greater scrutiny by external parties, thereby increasing the probability that a given reporting defect will be drawn to the FRRP's attention.

Academic research (e.g., Fama and Jensen, 1983; Jensen, 1993) and recent policy initiatives (e.g., Cadbury Report, 1992; Greenbury Report, 1995) highlight the importance of effective corporate governance for ensuring managerial accountability to shareholders. Dechow et al. (1996) and Beasley (1996) present evidence that firms violating US GAAP tend to have weak governance structures. We therefore predict that FRRP censure will be positively associated with weak governance structures. Similar to Dechow et al. (1996), we focus on the following governance mechanisms:

(i) *Boards:* A key function of the board is to monitor management. Financial statements are im-

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[8] Political considerations have also been linked with the SEC's decision to issue an Enforcement Action. For example, because there are more targets than it can practically pursue, the SEC ranks candidates for formal investigation according to the probability of success and the potential message value (Feroz et al., 1991).

[9] For example, like the FRRP, the SEC only makes its enforcement activities public when it files a formal complaint, thereby protecting the identity of firms that are cleared during the investigation process.

[10] We do not consider debt-related cost of capital issues because the relevant data are not available. In addition, prior research also suggests that the presence of earnings-based compensation plans creates incentives for managers to manipulate published financial statements (Healy, 1985). We do not examine the links between compensation and the probability of censure by the FRRP due to insufficient disclosure concerning the details of executive compensation for a large part of our sample period. Dechow et al. (1996) find no association between GAAP violations and the existence of earnings-based bonus plans for their sample of SEC Enforcement Action firms.

portant instruments in the monitoring process and their integrity is the responsibility of the board. Jensen (1993: 865) argues that large boards are less likely to monitor management effectively and are easier for the CEO to control. Both Yermack (1996) for the US and Conyon and Peck (1998) for the UK present evidence consistent with the view that larger boards are less effective monitors of management. We therefore predict that FRRP firms will be more likely to have larger boards. CEO domination is also less likely to occur if there is a separate chairman of the board (Cadbury Report, 1992). We therefore predict that FRRP firms are more likely to combine the role of chairman and CEO. Outside directors are hypothesised to be key agents in the monitoring process (Fama and Jensen, 1983). Consistent with this, Peasnell et al. (2001 and 2000) report a significant association between board composition and within-GAAP accruals manipulation. Hence, we predict that FRRP firms will have a lower proportion of outside directors. Furthermore, since boards often delegate specific responsibility for financial reporting to an audit committee (Cadbury Report, 1992), we also predict that FRRP firms are less likely to have an audit committee. Finally, in addition to these standard measures of board quality, we also test for differences in several director-specific characteristics such as age and board tenure. Our analysis is motivated by recent debates in the policy domain (e.g., Hampel Report, 1998, para. 3.21 and 3.22) concerning the possible link between such characteristics and director quality.[11] However, given their uncertain relationship with director quality, we offer no explicit predictions for these variables.

(ii) *Ownership:* Agency problems are most acute when managers have a low ownership stake in the business and external shareholders are diffuse (Jensen and Meckling, 1976; Black, 1992). To the extent that financial reporting quality is negatively associated with the degree to which managers' interests diverge from

those of shareholders (Warfield et al., 1995), we predict that FRRP firms will exhibit lower managerial equity ownership. Moreover, to the extent that effective monitoring is positively correlated with external shareholder concentration (Black, 1992), we predict that FRRP firms will be characterised by fewer external blockholders and smaller blockholder stakes.

(iii)*Auditing:* The function of the audit is to report on whether published financial statements present a true and fair view. FRRP censure is *prima facie* evidence of defective financial reporting and hence audit failure. Reputation and 'deep pocket' considerations predict that Big Five auditors may have more to lose from being associated with poor auditing (Lennox, 1999). Other things being equal, good audits also cost more (Craswell et al., 1995). We therefore predict that FRRP firms are (a) less likely to have a Big Five auditor and (b) more likely to pay lower audit fees. We also predict that FRRP firms are more likely to switch auditor in the period surrounding the defect year, either because of manager-auditor disagreements over the accounting issue in question, or because of the perceived failure of the auditor to effectively defend the agreed reporting decision.

We refer to these factors collectively as 'governance constraints'. In addition to examining the quality of governance mechanisms around the time the defective reports were issued, we also test whether internal governance structures change in response to public censure by the FRRP. In particular, we examine the incidence of board appointments and resignations in the period following the year in which the defective reports were issued and test whether censure by the FRRP led firms to change their board composition in an effort to improve board effectiveness.[12]

4. Sample and research design

The procedure used to identify our sample of FRRP adverse rulings is summarised in Table 1. From the FRRP's inception through to the publication of its 1998 Progress Report, 317 cases had been drawn to its attention, of which 191 (60%) were pursued beyond an initial inspection. Of those cases pursued beyond an initial investigation, 49 (26%) were publicly censured for issuing defective financial statements. One further case (First Choice Holidays plc), while not the subject of a press statement, was discussed in the 1995 Progress Report and is therefore included in the population of adverse rulings.[13] Of the remaining cases, 134 were judged not to have been defective, while seven were outstanding pending further investigation. Between December 1998 and May

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[11] For example, older directors and those with longer tenure may possess greater business expertise and better monitoring abilities. On the other hand, age and tenure may be negatively associated with director quality due to problems with health and a lack of independence.

[12] Dismissal is an extreme penalty for directors guilty of violating GAAP. It is possible that incumbent board members may be punished in a less severe fashion, for example by adjusting the terms of their compensation contracts or reducing their autonomy. Unfortunately, a detailed analysis of such sanctions is not possible due to data constraints for the period in question.

[13] Our results are not sensitive to the inclusion of this case.

Table 1
Cases referred to and subsequent action taken by the FRRP in relation to the financial reports of large UK firms with financial year-ends beginning on or after 23 December 1989[a]

	Financial Reporting Council Progress Report date							
	30/11/92	30/11/93	31/12/94	31/12/95	31/12/96	31/12/97	31/12/98	Totals
Outstanding at beginning of year	0	19	11	14	15	13	5	
Drawn to attention of FRRP during the year	78	45	46	43	49	24	32	317
Available for consideration	78	64	57	57	64	37	37	
Less:								
Not pursued	28	11	14	23	24	11	15	(126)
Pursued beyond initial inspection								191
Action taken								
Judged not to be defective	21	33	23	14	19	16	8	(134)
Judged defective (public statement issued)	10	9	6	4	8	5	7	49
Judged defective (no public statement issued)	0	0	0	1	0	0	0	1
Outstanding at year end	19	11	14	15	13	5	7	(7)
Public statements at 31/12/98								50
Plus:								
Public statements issued after 31/12/98								1
Total cases judged defective at 01/06/99								51
Less:								
Firms with missing data[b]								(4)
Final sample								47

[a] Data were obtained from the 'Progress Reports' published by the Financial Reporting Council. These reports provide details of the numbers of cases drawn to the Panel's attention, but only the names of censured firms.
[b] Not listed on the London Stock Exchange.

1999, the FRRP issued one further adverse ruling, bringing the total number to 51. These cases represent the starting point for our sample of defective annual reports. Four cases are dropped from this initial population because they relate to private firms for which the necessary data (including a matched control firm) could not be obtained, resulting in a final sample of 47 defective verdicts issued against 43 firms. Thirty-nine firms received a single adverse ruling while four received two separate adverse rulings for unrelated matters.[14]

The 47 public statements deal with 80 separate financial reporting issues in total. In only eight cases (17%) were the defective statements accompanied by a qualified audit report, two of which were for reasons other than those investigated by the FRRP.[15] The pattern of defects changes over time, largely in response to the introduction of new accounting standards.[16] The defective accounting treatments impacted directly on reported earnings or shareholders' funds in 18 cases (38%). In the

majority of these cases, the earnings effect of the defective accounting treatment was to increase profits. The remaining 29 cases related to disclosure and classification issues. Remedial action was agreed in 44 cases, the most common form of which was to correct the defect retrospectively in the subsequent year's accounts by restating comparatives or improving disclosure.[17] In only six of the cases was the company required to issue or reissue statements to their shareholders: Newarthill (press release #37), Butte Mining (press release #43) and Associated Nursing Services (press release #44) issued fully revised accounts; Butte Mining (press release #30) and Harvey's (press release #53) revised their accounts by way of a Supplementary Note; and Burn Stewart Distillers (press release #47) amended their accounts via a circular sent to shareholders. The mean (median) time elapsing between the signing of the audit report for the defective accounts and the date of the FRRP's public statement censuring the firm was 310 (326) days.

Table 2 reports the distribution of adverse rulings by industry classification and calendar year. Results reported in Panel A provide no evidence of any significant industry clustering, with 29 *Datastream* level-6 industry groups represented in the final sample. General Engineering has the highest number of adverse rulings with five cases, followed by Chain Stores and Investment Trusts, each with four cases. The lack of any distinct industry patterns among censured firms contrasts with the samples of SEC Enforcement Actions examined by Dechow et al. (1996) and Feroz et al. (1991). In those US studies, sample firms tend to cluster in certain industries (e.g., electronics, computing and financial services). We speculate that these differences may be driven by the SEC's proactive focus on emerging measurement and recognition issues that offer significant opportunities for earnings management (Feroz et al., 1991).

Panel B of Table 2 reports the frequency of defective financial reports across time. The earliest balance sheet date in our FRRP sample is 31 December 1990 and the latest is 30 April 1998. Except for 1991 with 11 defective reports (23%), there is little evidence of any substantial clustering of events in calendar time, although there is some slight suggestion that the number of cases may have fallen in recent years.[18] In subsequent sections, we refer to the period covered by the defective financial statements as either the 'defect year' or 'year 0'.

Consistent with the approach used by Beasley (1996) and Dechow et al. (1996) to study the characteristics of firms subject to SEC Enforcement Actions, we employ a matched-pairs research design whereby each of the 47 adverse rulings in the FRRP sample is matched with a 'similar' firm that

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[14] The four firms with two adverse rulings are Foreign and Colonial Investment Trust plc, Butte Mining plc, Associated Nursing Services plc and Stratagem plc. In the subsequent tests we treat separate adverse rulings for the same firm as independent events. In supplementary tests, we repeated all analyses after restricting the sample to a single adverse ruling per firm. Results based on this restricted sample were not materially different from those reported using the full sample and are therefore not reported.

[15] Where a defect is identified that is not referred to in the auditors' report, the FRRP must also report the case to the audit firm's regulatory body (usually the Institute of Chartered Accountants in England and Wales), which may then take disciplinary action against the auditor. No such disciplinary action was taken during the period examined in this paper. Recently, however, the ICAEW has started to discipline auditors involved in FRRP cases (Fearnley et al. 2000).

[16] For example, four cases associated with the reporting of cash flow information followed soon after the introduction of FRS 1, three cases of non-consolidation of subsidiaries followed the redefinition of subsidiaries in FRS 2, and six cases dealing with the analysis of shareholders' funds followed the implementation of FRS 4.

[17] Remedial action was not required in the case of Ultramar since it was subsequently taken over and so did not prepare accounts on the same basis, while Guinness Peat Group's advance use of FRED 1 and First Choice Holidays' interpretation of FRS 4 were overtaken by the introduction of FRS 3 and developments in the application of FRS 4, respectively.

[18] The higher frequency of adverse rulings in 1991 is consistent with the hypothesis that the Panel was especially keen to establish its authority as an effective enforcement mechanism during the early part of its operations (Styles, 1999).

[19] The main advantage of a matched-pairs design is that it provides a parsimonious means of controlling for certain potentially important confounding (non-accounting) firm-specific characteristics of censured firms. A possible alternative to this design would have been to compare FRRP firms with the population of non-censured firms (or a random sample drawn from the non-censured population). An advantage of this design would have been an increase in the precision of our coefficient estimation in our multivariate logit analysis. However, the data demands associated with many of our empirical predictions (particularly those relating to our governance variables) effectively precluded the use of such an approach.

Table 2
Size, time and industry characteristics for a sample of 47 cases subject to adverse rulings by the FRRP. Each of the 47 cases is matched with a control firm on the basis of industry and size at the beginning of the fiscal year in which the defective financial report was issued[a]

Panel A: FRRP firms by Datastream level-6 industry classification

Code	Name	obs	Code	Name	obs
AERSP	Aerospace	1	LEISR	Leisure facilities	1
BANKS	Banks	1	MEDPD	Medical prod. & suppl.	2
BMERC	Builders merchants	1	MIFIN	Mining finance	1
BRCAS	Broadcasting	1	MINES	Other mining	1
BUSUP	Business support	2	OILIN	Oil, integrated	1
CHAIN	Chain stores	4	OTHBM	Other building materials	2
DCOMP	Industrial components	3	OTHCN	Other construction	1
DIVIN	Diversified industrials	2	PAPER	Paper & packaging	1
ELETR	Electronic equipment	2	RLDEV	Property	2
ENGIN	General engineering	5	PUBLS	Publishing	1
FDPRD	Food producers	1	TELCM	Telecommunications	1
HOSPM	Hospital management	1	TEXOT	Textiles & leather goods	1
HOTEL	Hotels	1	WASTE	Waste control	1
INSNL	Insurance (non-life)	1	WINES	Spirits, wines & ciders	1
INVTR	Investment trusts	4			

Panel B: Calendar year of defective annual report

Year	Number of cases	Year	Number of cases
1990	2	1995	8
1991	11	1996	3
1992	7	1997	5
1993	3	1998	1
1994	7		

Panel C: Firm size, measured at beginning of defect year

	(£m)		
	FRRP	Control	
Variable	Mean (Median)	Mean (Median)	p-value for difference[b]
Total assets employed	1087.45 (75.641) N = 47	1417.898 (88.301) n = 47	0.320 0.243
Market value of equity	986.11 (95.272) N = 43	1185.31 (143.34) n = 46	0.726 0.519

[a] The sample of 47 cases comprises 43 individual firms: 39 firms have a single adverse ruling and four firms are associated with two (independent) adverse rulings. FRRP firms are matched with control firms on the basis of beginning of period total assets employed, fiscal year and *Datastream* industry group.
[b] A paired t- (Wilcoxon) test is used to evaluate the difference in means (medians) for total assets employed, while for market capitalisation, a standard t- (Wilcoxon) test is employed.

did not receive an adverse ruling.[19] Control firms were identified using the following matching procedure:

(a) Measure total assets employed for FRRP firms at the start of the defect year;
(b) Identify all firms in the *Datastream* 'Alive' and 'Dead' stocks files in the same level-6 industry group as the FRRP firm with non-missing total assets employed data for the same fiscal year and which have not themselves been the subject of an adverse ruling;[20]
(c) Select a control firm that minimises the absolute difference in total assets employed

(measured at the beginning of the defect year), subject to this difference not exceeding ±25% of the total assets figure for the FRRP firm. In the event that this condition is not met, repeat steps (b) and (c) using the *Datastream* level-4 industry classification;

(d) Retain the control firm if the financial statements are available. If the financial statements are unavailable for the first-best selection, then use the next-best match available.

Of the 47 FRRP cases in our final sample, 43 (3) are matched with a control firm at level-6 (level-4). For one firm (British Gas; press release #14), its extreme size and monopolistic characteristics meant that no equivalent sized-matched control in the same industry could be found, even using the broadest industry measure available (level-2). In this case, therefore, we matched solely on the basis of size and time period.[21] Results presented in Panel C of Table 2 indicate that the matching procedure has been successful in identifying control firms of a similar size. FRRP firms have median total assets employed of £75.6m, compared with £88.3m for the control sample. A paired-Wilcoxon test fails to reject the null hypothesis that these values differ. Results presented in Panel C also indicate that the market capitalisations of the two samples do not differ significantly: median market capitalisation for the FRRP sample is £95.3m, compared with £143.3m for the control sample.[22]

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[20] The level-6 industrial grouping is the most narrowly defined industry classification reported by *Datastream*.

[21] To assess the sensitivity of our findings to the inclusion of this non-industry-matched pair, we repeated all tests after excluding British Gas and its associated control firm. Results were unchanged. Full details of the 47 FRRP cases and their associated control firms are available from the authors on request.

[22] Tests using market capitalisation are based on fewer than 47 observations per sample because share prices were unavailable for four FRRP firms and one control sample firm in the year prior to the defect year. The four FRRP firms with missing year −1 data are Guinness Peat Group plc (press release #12: shares suspended), Newarthill plc (press release #37: only preference shares listed), Butte Mining plc (press release #43: shares suspended), and Harvey's plc (press release #53: not listed).

[23] The restated figures are obtained from the revised accounts and the retrospectively restated comparative figures presented in firms' annual reports in year +1.

[24] Five cases in the FRRP sample had negative shareholders' equity at the beginning of the defect year. For these firms, we replaced this negative value with the first available positive shareholders' equity value prior to the defect year. All members of the control sample had positive shareholders' equity values throughout the sample period. Qualitatively similar results are obtained when we scale by beginning-of-period total assets.

[25] Throughout the paper we report p-values based on one-tailed tests when our predictions are directional. In those cases where no predictions are offered (e.g., director-specific variables such as age and tenure – see Table 3), we report p-values based on two-tailed tests.

Overall, FRRP firms appear to be larger than firms subject to SEC Enforcement Actions for the violation of US GAAP. For example, Dechow et al. (1996) and Beasley (1996) report median market capitalisations of only $65.6m and $26.6m (approximately £41m and £16.6m) for their respective samples of GAAP violators.

Four years of data beginning one year prior to and ending two years after the defect year were collected for the 47 firms in each of the FRRP and control samples. The primary data source was firms' published annual reports and accounts, supplemented by information from *Datastream* and *Extel*. Table 3 presents a list of all variables used in the study, together with their associated definitions and the predicted direction of association with the likelihood of an adverse FRRP ruling.

5. The characteristics of censured firms

5.1. Univariate tests

5.1.1. Financial motives

We begin by examining the profitability of the FRRP and control samples over the period surrounding the defect year. Panel A of Figure 1 reports median earnings levels from year −1 to year +2, while Panel B reports median earnings changes. We present two graphs in each Panel, one using the original reported earnings for the FRRP sample and the other using the year 0 restated figures for the FRRP sample.[23] The control sample series are the same for both graphs in each Panel. Both level and change specifications are scaled by beginning-of-period book value of shareholders' equity.[24] A sharp decline in both the level and change in earnings is clearly evident for the FRRP sample in the defect year, using either the published or the restated data. For earnings levels, this decline is significant at the 0.01 (0.05) level for the restated (published) figures using a one-tailed test.[25] In contrast, the decline for earnings changes in Panel B is not significant at conventional levels for either the published or restated figures using a one-tailed test. Further examination of Panels A and B reveals that the performance problems experienced by the FRRP sample appear to be largely confined to the defect year: their performance is similar to that of the control sample in years −1 and +1. As such, their poor performance problems appear to be more reflective of short-term difficulties than any inherent long-term weaknesses. Moreover, to the extent that the decline is clearly evident for the as-published series in Panel A, it suggests that any attempts by managers of FRRP firms to use GAAP violations as a means of masking their firm's performance difficulties were not completely successful.

Panel A of Table 4 reports scaled earnings levels and changes for the FRRP and control samples in years 0 and −1. Mean (median) scaled earnings for

Table 3
Variable definitions. All data are obtained from firms' annual reports unless otherwise stated

| Variable	Definition	Predicted sign[a]
Financial motives		
Earnings	Published earnings figure used in calculation of basic EPS.	(−)
Dividend increase	1 if dividend per share increased, 0 otherwise.	(−)
Restructuring	1 if any reference is made to material ongoing restructuring activity (e.g., divestitures, job cuts, exit from product lines, etc.) in firm's annual report, 0 otherwise.[b]	(+)
Positive outlook	1 if Chairman's Statement is broadly optimistic for year ahead (e.g., forecasted growth in EPS, sales, market share, etc.), 0 otherwise.[b]	(−)
Leverage (LEV)	Total debt / total debt plus total assets.	(+)
New share issues	1 if the firm made an equity offering (rights issue, placing or cash offer) during the year, 0 otherwise.	(+)
Book value of shareholders' equity	Shareholders' equity, measured at beginning of period.	n.a.
Governance constraints		
Board size (BRDSIZE)	Total number of board members.	(+)
% outsiders (%OUT)	Number of outside directors / total number of directors.	(−)
% independent outsiders	Number of independent outside board members / total number of board members. Outsides are classified as independent if their tenure as a board members does not exceed 5 years, they are not ex-employees of the firm or related to senior management, they are not consultants, lawyers, or financial advisors, and they are not engaged in a reciprocal interlock.	(−)
Audit committee (AC)	1 if an audit committee exists, 0 otherwise.	(−)
AC size	Total number of audit committee members.	(?)
% outsiders on AC	Number of outsiders on AC / total number of members on AC.	(−)
Tenure	Time (in years) since director first appointed to board.	(?)
Age	Board members' age (in years).	(?)
Dual (DUAL)	1 if chairman and CEO are same person, 0 otherwise.	(+)
Founder	1 if founder or founder's relative is board member, 0 otherwise.	(?)
% shares (group)	Number of equity shares held by group in question / total number of shares outstanding.	(−)
Block5	1 if external shareholder holds > 5% of outstanding shares, 0 otherwise.	(−)
Block10	1 if external shareholder holds > 10% of outstanding shares, 0 otherwise.	(−)
Block20	1 if external shareholder holds > 20% of outstanding shares, 0 otherwise.	(−)
Audit fee (FEE)	£ millions.	(−)
Big Five (BIG5)	1 if firm audited by Big Five firm, 0 otherwise.	(−)
Auditor changes (SWITCH)	1 if change in auditor identity during the year, 0 otherwise.	(+)

[a] Predicted value for the FRRP sample relative to the control sample.
[b] Based on a subjective analysis of textual data contained in the published annual report.

Figure 1
Median level and change in reported earnings, scaled by beginning-of-period shareholders' equity, for the FRRP and control samples. Separate plots are presented using the as-reported data ('Published') and the pre-violation data ('Restated', i.e. published figures in years –1, +1, and +2 and restated figures in year 0) for the FRRP sample. Each of the 47 FRRP firms is matched with a control firm on the basis of industry and size at the beginning of the year in which the defective financial report was issued (year 0). The solid line represents the FRRP sample and the broken line represents the control sample. Sample sizes vary across time due to sample attrition and data availability

Panel A: Earnings levels
The solid (broken) line is the FRRP (Control) sample
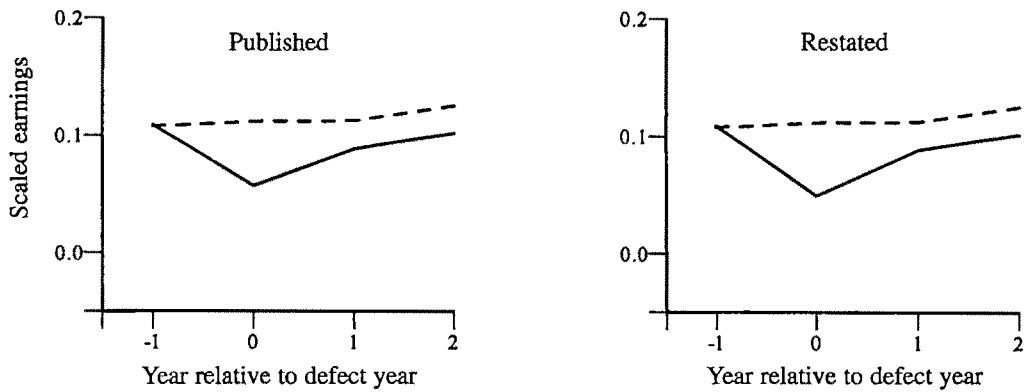
Panel B: Earnings changes
The solid (broken) line is the FRRP (Control) sample
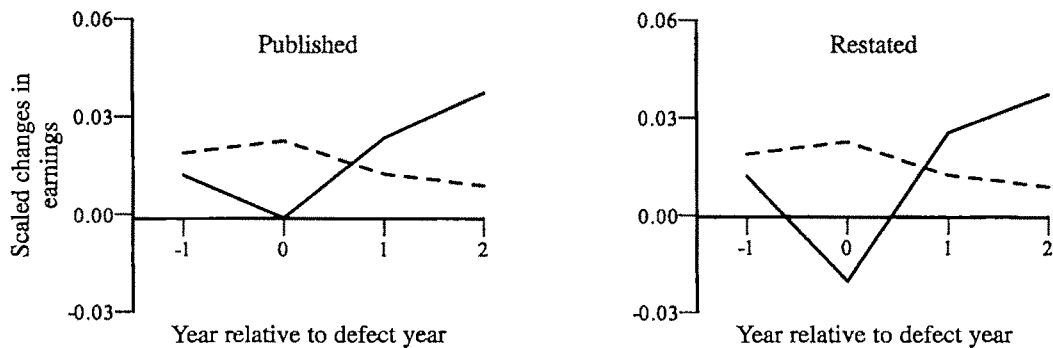
the FRRP sample in year 0 are 0.011 (0.057) using the published figures and –0.004 (0.049) using restated data, compared with 0.125 (0.112) for the control sample. Similarly, the FRRP sample also displays lower earnings changes using both the published and restated data, although only the median differences are significant at conventional levels. By contrast, there is little evidence that

earnings levels and changes for the FRRP sample differ from the control sample in year –1. Overall, the earnings patterns documented for the FRRP sample in figure 1 and Panel A of Table 1 suggest that they are more likely to display weaker earnings performance in the defect year. More generally, however, these firms appear average performers experiencing temporary 'blips' in reported per-

Table 4
Financial performance for the FRRP and control samples. Each of the 47 FRRP firms is matched with a control firm on the basis of industry and size at the beginning of the fiscal year in which the defective financial report was issued (year 0)

	Years relative to defect year (0)					
	— Year −1 —		p-value for	— Year 0 —		p-value for
Variable[a]	FRRP	Control	difference[b]	FRRP	Control	difference[b]
Panel A: Earnings performance[c]						
Earnings (published)						
Mean	0.080	0.227	0.087	0.011	0.125	0.098
Median	0.109	0.108	0.626	0.057	0.112	0.081
Earnings (restated)						
Mean	n.a.	n.a.	n.a.	−0.004	0.125	0.074
Median	n.a.	n.a.	n.a.	0.049	0.112	0.049
ΔEarnings (published)						
Mean	0.028	0.048	0.380	0.099	0.055	0.346
Median	0.012	0.019	0.245	−0.001	0.023	0.036
ΔEarnings (restated)						
Mean	n.a.	n.a.	n.a.	0.085	0.055	0.396
Median	n.a.	n.a.	n.a.	−0.020	0.023	0.011
Panel B: Earnings relative to targets[d]						
Earnings (published) ≤ 0 (%)	17.02	10.64	0.370	23.40	8.51	0.025
Earnings (restated) ≤ 0 (%)	n.a.	n.a.	n.a.	27.66	8.51	0.008
ΔEarnings (published) ≤ 0 (%)	n.a.	n.a.	n.a.	51.06	29.79	0.018
ΔEarnings (restated) ≤ 0 (%)	n.a.	n.a.	n.a.	55.32	29.79	0.006
Panel C: Additional performance indicators						
Dividend increase = 1 (%)	58.70	73.91	0.062	55.32	82.98	0.002
Restructuring = 1 (%)	47.83	21.74	0.005	53.19	21.28	0.001
Positive outlook = 1 (%)	65.22	78.26	0.083	48.94	89.36	0.001
New share issue = 1 (%)	19.15	10.64	0.124	17.02	17.02	1.000
Leverage						
Mean	0.512	0.370	0.131	0.499	0.331	0.019
Median	0.390	0.280	0.011	0.390	0.360	0.037

[a] Variable definitions are presented in Table 3.
[b] Probability values relate to one-tailed tests. Differences in means (medians) are assessed using a paired t-(Wilcoxon) test. Differences in sample proportions are assessed using a Chi-square test.
[c] Earnings (ΔEarnings) are scaled by shareholders' equity measured at the beginning of the period.
[d] We employ two earnings targets: the desire to avoid reporting (a) an earnings loss (Earnings ≥ 0) and (b) an earnings decrease (ΔEarnings ≥ 0), where Δ denotes the change.

formance as opposed to perennial underachievers.

Recent evidence presented by Degeorge et al. (1999) and Burgstahler and Dichev (1997) suggests that consideration of thresholds such as zero levels and zero changes in earnings may be important in the context of poor performance and low quality accounting. First, these reference points provide a simple heuristic procedure for discriminating between 'good' and 'bad' performers. Secondly, the likelihood of failing to achieve these thresholds may be associated with the incidence of GAAP violations. Specifically, undershooting

these targets may impose significant costs on managers (e.g., lower compensation, increased scrutiny from external stakeholders, and a higher probability of dismissal), thereby motivating them to manipulate reported numbers in an effort avoid such costs (Degeorge et al. 1999). Ultimately, however, we are unable to determine the extent to which temporary poor performance causes managers to manipulate earnings, as opposed to increasing its probability of detection.

Panel B of Table 4 reports evidence on the frequency of losses and earnings decreases for the

FRRP and control samples. Results indicate that FRRP firms are characterised by a higher frequency of losses and earnings declines in the defect year. For example, while only 8.5% of firms in the control sample report losses in the defect year, the equivalent figure for the FRRP sample is 23.4% using the published data and 27.7% using the restated data. In both cases the differences are significant at the 0.05 level. Similarly, 51% of the FRRP sample report a decline in earnings in the defect year (55% using the restated data) compared with only 29.8% of the control sample. These differences are again significant at the 0.05 level. Results therefore indicate that FRRP firms are indeed characterised by poor performance in the defect year when earnings are benchmarked against standard performance thresholds. Overall, losses and earnings declines appear to be important characteristics distinguishing FRRP firms from their control sample counterparts.

Further evidence of the performance difficulties and associated pressures faced by FRRP firms in the defect year is presented in Panel C of Table 4. While 83% of the control sample sanction dividend increases in the defect year, the comparable figure is only 55% in the FRRP sample. Similarly, while almost 90% of the control sample report a positive outlook for the coming year in the Chairman's Statement, less than 50% of chairmen in the FRRP sample provide optimistic forecasts for the year ahead. Consistent with results reported by Dechow et al. (1996) for their sample of firms subject to SEC Enforcement Actions, FRRP firms are also more highly levered than firms in the control sample. Finally, 53% of FRRP firms report material restructuring activity in the defect year, compared with only 21% of the control sample. All of these differences are significant at the 0.05 level or better under a one-tailed test. Together, these findings provide additional support for the view that censured firms are typified by weak financial performance in the defect year. In contrast, there is less evidence of weak financial performance in year −1 for the FRRP sample, with only (median) leverage and the incidence of material restructuring activity being significantly higher at the 0.05 level. Finally, results in Table 4 provide no evidence of a higher demand for external equity financing among FRRP firms: approximately 17% of firms in both samples issue new shares in the defect year. These findings do not support the conclusion in Dechow et al. (1996) that the desire to obtain low cost external capital represents an important motive for defective financial reporting.[26]

5.1.2. Governance constraints

Table 5 reports descriptive statistics for a range of governance-related characteristics including au-

ditor quality, ownership structure, and board composition and structure. Auditor characteristics are presented in Panel A of Table 5. The frequency of Big Five auditors is significantly lower among FRRP firms compared with the control sample. For example, although 65% of FRRP firms have a Big Five auditor in year −1, the equivalent figure for the control sample is 83% (p < 0.05). Similarly, the frequency of Big Five auditors among the FRRP sample is 68% in the defect year, compared with 87% for the control sample (p < 0.05). These results support our prediction that the frequency of Big Five auditors will be smaller in the FRRP sample and are consistent with the positive association between auditor size and audit quality documented in prior work (e.g., DeFond and Jiambalvo 1991; Palmrose 1988; DeAngelo 1981). Note, however, that of the 15 firms in the FRRP sample with a non-Big Five auditor, four cases (26.7%) received a qualified audit report. In contrast, only four out of the 32 cases (12.5%) involving Big Five auditors received qualified opinions. Moreover, contrary to our prediction, the average level of audit fees paid by censured firms is statistically indistinguishable from that in the control sample. This finding, coupled with the evidence on audit qualifications, casts doubt on the auditor quality interpretation of our results for auditor type. It is therefore tempting (but premature) to conclude that the lower incidence of Big Five auditors among FRRP firms reflects a bias (for whatever reason) in the process leading to the issuance of an adverse ruling.[27]

The final row of Panel A presents the frequency of auditor switches for the two samples. While the frequency of switches for FRRP firms is higher in both the defect year and year −1, the differences

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[26] This finding is consistent with the lack of a significant share price decline around the FRRP censure announcement date (Brandt et al, 1997; Böckem, 1998; Hines et al., 1999), implying that managers were not attempting to exploit short-term overvaluation of the firm. Beneish (1999) also fails to replicate Dechow et al.'s findings.

[27] A third possible explanation for the higher incidence of non-Big Five auditors relates to the weak financial condition of FRRP firms. Haskins and Williams (1990) report that financially distressed firms are more likely to appoint non-Big Five auditors to reduce costs. The presence of financial distress might explain the fact that the choice of a non-Big Five auditor appears not to be associated with lower audit costs, since the audit fee might contain a risk premium in such circumstances. Two factors suggest that this explanation is unlikely to account for the observed differences in auditor type in the present study. The first is that while the FRRP sample is associated with declining performance and higher leverage in the defect year, these firms are not financially distressed in the sense of being more likely to become bankrupt. Furthermore, the average tenure of auditors in the FRRP sample exceeds five years, indicating that the decision to appoint the incumbent auditor could not have been influenced by the temporary performance difficulties experienced by these firms in the defect year.

Table 5
Governance characteristics for FRRP and control samples. Each FRRP firm is matched with a control firm on the basis of industry and size (total assets employed) at the beginning of the fiscal year in which the defective financial report was issued (year 0). Sample sizes vary according to data availability

		Years relative to defect year (0)					
		Year −1		p-value for	Year 0		p-value for
Variable[a]		FRRP	Control	difference[b]	FRRP	Control	difference[b]
Panel A: Audit characteristics							
Audit Fee (£m)							
	Mean	0.564	0.607	0.670	0.577	0.603	0.766
	Median	0.205	0.130	0.957	0.200	0.150	0.571
	N	46	46		47	47	
Big5	= 1 (%)	65.22	82.61	0.058	68.09	87.23	0.026
Switch	= 1 (%)	10.87	4.35	0.238	6.38	4.26	0.646
Panel B: Ownership structure							
% shares (board)							
	Mean	12.450	11.690	0.807	11.550	11.590	0.989
	Median	1.170	3.630	0.902	1.170	1.290	0.811
	N	46	46		47	47	
% shares (OUT)							
	Mean	1.400	2.040	0.548	1.060	2.887	0.158
	Median	0.040	0.040	0.803	0.040	0.040	0.439
	N	46	46		47	47	
% shares (largest blockholder)							
	Mean	12.330	9.510	0.217	11.410	10.200	0.536
	Median	8.750	8.000	0.776	9.700	8.100	0.850
	N	46	46		47	47	
% shares (total blockholders)							
	Mean	27.640	24.102	0.360	26.280	27.030	0.846
	Median	21.500	23.700	0.941	20.500	24.800	0.521
	N	46	46		47	47	
No. external holders > 3%							
	Mean	3.696	4.022	0.395	3.681	4.447	0.096
	Median	3.000	3.000	0.297	3.000	4.000	0.059
	N	46	46		47	47	
Block5	= 1 (%)	76.09	80.43	0.613	76.60	74.47	0.810
Block10	= 1 (%)	41.30	36.96	0.669	42.55	42.55	1.000
Block20	= 1 (%)	15.22	6.52	0.180	10.64	8.51	0.726
Panel C: Board structure							
Board size							
	Mean	8.674	7.804	0.036	8.383	7.979	0.193
	Median	8.000	8.000	0.062	8.000	8.000	0.265
	N	46	46		47	47	
% OUT							
	Mean	0.398	0.396	0.953	0.399	0.426	0.219
	Median	0.400	0.400	0.990	0.400	0.400	0.330
	N	46	46		47	47	
% independent OUT							
	Mean	0.142	0.110	0.281	0.131	0.141	0.367
	Median	0.125	0.111	0.349	0.100	0.111	0.392
	N	46	46		47	47	
AC size							
	Mean	3.333	3.036	0.357	3.276	3.273	0.991
	Median	3.000	3.000	0.376	3.000	3.000	0.717
	N	24	28		29	33	

Table 5 *(continued)*

| Variable[a] | Years relative to defect year (0) | | | | | |
| | —— Year –1 —— | | p-value for | —— Year 0 —— | | p-value for |
	FRRP	Control	difference[b]	FRRP	Control	difference[b]
% OUT on AC						
Mean	0.976	0.853	0.007	0.968	0.876	0.021
Median	1.000	1.000	0.010	1.000	1.000	0.029
N	24	28		29	33	
Board tenure (years)						
Mean	6.195	6.520	0.756	6.122	6.309	0.815
Median	5.668	5.835	0.629	6.014	5.986	0.925
N	46	46		47	47	
OUT tenure (years)						
Mean	6.358	7.185	0.359	5.867	7.261	0.252
Median	4.930	6.607	0.338	5.099	6.639	0.126
N	41	43		45	46	
Board Age (years)						
Mean	53.414	55.118	0.340	54.289	54.803	0.751
Median	55.000	55.000	0.525	55.000	55.000	0.996
N	35	38		38	38	
OUT Age (years)						
Mean	56.530	60.111	0.036	57.611	58.947	0.399
Median	57.000	60.250	0.087	58.750	60.000	0.442
N	32	33		36	38	
AC = 1 (%)	52.17	60.87	0.400	61.70	70.21	0.384
RC = 1 (%)	47.83	54.35	0.532	59.57	61.70	0.833
Dual = 1 (%)	28.26	41.30	0.189	25.53	42.55	0.082
Founder = 1 (%)	28.89	30.43	0.872	23.40	29.79	0.484

[a] Variables definitions are presented in Table 3.

[b] For the continuous variables with complete data (i.e., N = 46 in year –1 or N = 47 in year 0) a matched pairs t- (Wilcoxon) test is used. An unmatched t- (Wilcoxon) test is used for the continuous variables that have missing observations. For the binary variables, the difference in sample proportions is assessed using a chi-square test. Where the sign of the difference is in the predicted direction, the p-values relate to one-tailed tests. Otherwise, p-values relate to two-tailed tests.

are not significant. Additional (untabulated) results also indicate that the frequency of changes in years +1 and +2 are not significantly higher for the FRRP sample. By contrast, the *aggregate* number of auditor changes occurring during the full four-year sample window (years –1 to +2) is higher than expected in the FRRP sample. In particular, 10 FRRP cases were associated with a single auditor change, with three others changing auditors twice. During the same period, four control firms changed auditors once and two changed auditors twice. A chi-square test rejects the null hypothesis that the aggregate changes are equal at the 0.036 level (one-tailed).[28] In sum, while we are unable to document a significant difference in the frequency of auditor switches in any particular sample year, there exists weak evidence that the aggregate frequency of switches over the four-year sample window is higher in the FRRP sample. Our findings

are consistent with those reported by Brandt et al. (1997) who conclude that the frequency of auditor switches among FRRP firms appeared to exceed that documented for other UK firms. The lack of any strong annual effect, however, means that we are unable to determine whether these switches are the cause, or the result, of defective financial reporting.

Table 5 Panel B reports data on ownership structure. The results provide little support for our predictions concerning the ownership of FRRP firms. For example, the mean (median) percentage of shares held by the board is 11.5% (1.2%) for both samples in year 0. Outside directors hold insignificant levels of equity in both samples, while the mean holdings of the largest external blockholder and the aggregate of all external blockholders are equivalent for both samples at around 10% and 27%, respectively. The frequency of 5%, 10%, and 20% external blockholders is also very similar in the two samples. However, the number of external blockholders is (weakly) significantly lower for

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[28] This test treats multiple auditor changes as independent observations.

the FRRP sample in year 0.

Panel C of Table 5 reports board-related data. The findings provide no evidence that the board structure in the FRRP sample is inferior to that of the control sample. The average board comprises roughly eight members in both samples, of which 40% are outsiders. Independent outsiders hold approximately 12% of board seats in both cases. The univariate results for board composition are not consistent with those of Beasley (1996) and Dechow et al. (1996), both of whom report a lower incidence of outside directors on the boards of US firms charged by the SEC with serious GAAP violations. Similarly, no significant differences in the director-specific variables such as age and tenure are apparent. While fewer firms in the FRRP sample have an audit committee in the defect year (62% compared with 70% in the control sample), the difference is not significant. In both samples, the audit committee is composed of approximately three members. Contrary to expectations, however, the proportion of outside audit committee members is significantly higher among FRRP firms for years 0 and –1. Moreover, the fraction of firms separating the roles of Chairman and CEO is also higher for the FRRP sample: 74% of censured firms have a separate Chairman and CEO in the defect year, compared with only 57% of firms in the control sample (p < 0.1). In sum, these findings provide no support for the view that inadequate internal monitoring is associated with GAAP violations. Indeed, results for audit committee composition and CEO duality suggest the opposite.

5.2. Multivariate tests
5.2.1. Full sample

To evaluate the marginal effect of performance and governance factors on the probability of censure by the FRRP, we estimate a series of logistic regressions. The dependent variable in these regressions takes the value of one if the firm is from

the FRRP sample and zero otherwise. Explanatory variables include measures of performance, leverage, new equity issues, board and ownership structure, and auditor type.

Results for logistic regressions estimated using data from the defect year are presented in Table 6. We begin by examining the association between earnings performance and the probability of censure by the FRRP. Four alternative model specifications are presented capturing different aspects of earnings performance. In Model 1, earnings performance is measured using a dummy variable (LOSS) set equal to one if restated earnings are negative and zero otherwise. The LOSS variable is significant at the 0.06 level in a one-tailed test and the positive coefficient indicates that FRRP firms are more likely to be loss-making in the defect year. Based on the implied probabilities from Model 1, loss-making firms are 3.3 times more likely to be censured by the FRRP compared to profitable firms.[29] In Model 2, earnings performance is measured using a dummy variable (DECLINE) set equal to one if restated earnings are less than last year's reported earnings and zero otherwise. The estimated coefficient on DECLINE in Model 2 is positive and significant at the 0.01 level, thereby confirming our univariate results which indicate that FRRP firms are more likely to experience an earnings decline in the defect year. Moreover, the effect is also economically significant, in the sense that the implied probability of censure by the FRRP is almost four times larger for firms with earnings decreases compared to firms with earnings increases. Model 3 includes both LOSS and DECLINE to assess the marginal association of each with the probability of censure. While the estimated coefficients on both variables are positive, only DECLINE is significant at conventional levels, suggesting that earnings reductions have an incremental positive association with the probability of a firm receiving an adverse ruling from the FRRP even after controlling for the existence of losses.

In Model 4 we use an indicator variable (LOSS/DECLINE) that takes the value of one if the firm reports either a loss or an earnings decline (or both) and zero otherwise. The resulting coefficient estimate on this variable is positive and highly significant. Once again, the effect is also economically significant, with the implied probability of censure rising by a factor of 3.5 for firms with losses or earnings decreases. Thus, these logistic regressions support the univariate tests that identified poor earnings performance as a key characteristic of firms censured by the FRRP.[30]

Turning to the remaining explanatory variables, since the results are almost identical for all four models in Table 6, the following discussion focuses on the coefficient estimates from Model 4.

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[29] Implied probabilities for a given explanatory variable are computed after setting all remaining dummy (continuous) variables equal to one (their sample means). Due to the choice-based nature of our sampling approach, the intercept term in our logistic models is biased (Maddala, 1991). Following Maddala, we have corrected the intercept values when computing these implied probabilities to reflect the low probability of any firm being subject to an adverse ruling by the FRRP. Our adjustment factor is the number of censured cases (47) divided by the approximate number of non-censured London Stock Exchange firm-year observations for the sample period (14,000, comprising 2,000 London Stock Exchange firms per year for seven years). The orders of magnitude of the likelihood ratio of FRRP censure reported in the text are not sensitive to alternative assumptions regarding the size of the non-censured population.

[30] To further aid interpretation, we also report the marginal effect (first derivative) for each variable in Model 4; each effect can be interpreted as the incremental probability of an adverse FRRP ruling given a one percent increase in the magnitude of the associated explanatory variable.

Table 6
Logistic regressions relating the probability of censure by the FRRP to measures of firm performance, leverage, new equity issues, board structure, ownership structure and auditor type. The sample comprises 47 FRRP firms and 47 control firms. Each of the 47 FRRP firms is matched with a control firm on the basis of industry and size (total assets employed) at the beginning of the year in which the defective financial report was issued

Variable[a]	Predicted Sign	Model 1 Coefficient (p-value)[b]	Model 2 Coefficient (p-value)[b]	Model 3 Coefficient (p-value)[b]	Model 4 Coefficient (p-value)[b]	Marginal effect[c]
Intercept	(?)	1.377 (0.408)	1.665 (0.333)	1.532 (0.379)	1.754 (0.303)	–
LOSS	(+)	1.228 (0.054)	–	0.519 (0.272)	–	
DECLINE	(+)	–	1.312 (0.006)	1.176 (0.034)	–	
LOSS/DECLINE	(+)	–	–	–	1.249 (0.008)	0.312
LEV	(+)	1.005 (0.109)	1.469 (0.028)	1.290 (0.060)	1.221 (0.062)	0.305
ISSUE	(+)	–0.183 (0.786)	–0.123 (0.857)	–0.217 (0.758)	–0.197 (0.774)	–0.049
BRDSIZE	(+)	0.120 (0.100)	0.070 (0.233)	0.086 (0.195)	0.073 (0.221)	0.018
OUT	(–)	–1.705 (0.130)	–2.351 (0.070)	–2.291 (0.075)	–2.399 (0.065)	–0.599
AC	(–)	–0.796 (0.065)	–0.828 (0.085)	–0.858 (0.080)	–0.826 (0.085)	–0.206
DUAL	(+)	–1.273 (0.026)	–1.662 (0.006)	–1.587 (0.010)	–1.598 (0.007)	–0.399
OWN	(–)	–1.564 (0.185)	–1.995 (0.135)	–1.897 (0.150)	–1.940 (0.141)	–0.485
BLOCK	(–)	0.113 (0.846)	0.158 (0.791)	0.155 (0.796)	0.132 (0.824)	0.033
BIG5	(–)	–1.503 (0.015)	–1.467 (0.020)	–1.439 (0.044)	–1.475 (0.019)	–0.364
Model χ^2		22.345	26.487	26.859	25.858	
p-value		0.013	0.003	0.005	0.004	

[a] LOSS is an indicator variable that takes the value of one if reported earnings are negative, and zero otherwise. DECLINE is an indicator variable that takes the value of one if the change in reported earnings is negative, and zero otherwise. LOSS/DECLINE is an indicator variable that takes the value of one if either the level or change in reported earnings is negative, and zero otherwise All remaining variables are defined in Table 3.
[b] With the exception of the intercept, all p-values are for a one-tailed test.
[c] Marginal effect of the regressors on the probability of censure computed using coefficient estimates from Model 4. Marginal effects are calculated at the means of the regressors as follows: $p(y) \cdot [1-p(y)] \cdot \beta$, where $p(y)$ is given by $1/(1+e^{-X\beta})$ and β is the appropriate coefficient estimate from Model 4.

Consistent with the univariate findings, the coefficient on the auditor variable (BIG5) is negative and significant at the 0.05 level. Moreover, in addition to being statistically significant, the Big Five effect also appears to be economically signif-

icant: the implied probability of censure increases by a factor of 3.6 for firms without a Big Five auditor. The leverage variable is positive and (weakly) significant, confirming the univariate finding that FRRP firms tend to be associated with higher

levels of gearing. The estimated coefficient on DUAL is also significant but with the opposite sign to that predicted. In contrast to our univariate findings, however, the board composition (OUT) and audit committee (AC) variables display their predicted signs and are weakly significant ($p < 0.1$, one-tailed test), providing limited support for the prediction that FRRP firms are associated with weaker internal governance systems. These findings highlight the importance of controlling for confounding effects when attempting to isolate the impact of board structure on the likelihood of censure by the FRRP.

5.2.2. Sample partitioning

FRRP firms are not homogenous with respect to the severity of the reporting defect. While in some cases the defect relates to relatively minor disclosure issues with no immediate asset measurement or earnings recognition implications, other cases are associated with a material impact on reported earnings and shareholders' funds. Although the FRRP is keen to emphasise that all cases involving an adverse ruling represent defects that, in its eyes, are materially misleading to investors (McBarnet and Whelan 1999:79), heterogeneity among the 47 cases raises the possibility that pooling all observations in a single group may not be appropriate.

To explore whether our results are affected by the nature of the accounting defect, we created a dummy variable (MAT) set equal to one if the defect identified by the FRRP impacted on reported profits and (or) shareholders' funds and zero otherwise. Eighteen cases (38.3%) involved accounting treatments that affected either reported earnings or shareholders' funds. The remaining 29 cases where MAT equals zero relate to disclosure and classification issues. We then re-estimated the logistic models in Table 6 after interacting MAT with each of the explanatory variables. We found no evidence of differential coefficient estimates for the two defect sub-samples. In particular, none of the interaction terms which capture the marginal effect of the explanatory variables on the probability of censure for firms with material defects were significant at the 0.1 level or better (one-tailed tests).[31] While these findings suggest that the same model is applicable to all firms censured by the FRRP regardless of defect type, we cannot rule out the possibility that the null results are due to a lack of power resulting from the relatively small size of the sample.

6. Changes in board composition

In addition to conducting a static analysis of board composition, we also examine director turnover rates surrounding the period in which the defective reports were issued. The issue of director turnover is interesting for two reasons. First, Warner et al.

(1988) and Weisbach (1988) document a negative association between firm performance and the probability of management change, while Gilson and Vetsuypens (1993) find that firms experiencing financial distress tend to have high management turnover. This raises the possibility that even though the 'stock' of directors in the FRRP and control samples is similar, the 'flow' of resignations and new appointments may differ. As a result, we examined the frequency of board appointments and dismissals in the defect year and the year immediately preceding it. Secondly, to the extent that FRRP rulings provide a visible signal of boards' monitoring failures, we might expect to observe higher turnover rates in the post-discovery period as FRRP firms seek to (i) punish the incumbent directors responsible for past failures and (ii) improve board quality through new appointments. We therefore also examined the frequency of board appointments and dismissals around the time the defective financial reports were issued.

We explore the issue of board changes by examining mean and median turnover frequencies in years -1 to $+2$ for the FRRP and control samples. Separate analyses are performed for three board measures: (a) all board members, (b) insiders only, and (c) outsiders only. For each measure, we examine the frequencies of resignations/retirements and new appointments separately.[32] Results (not reported in a table) provide little evidence of unusual turnover frequencies among board members in the FRRP sample. For example, total board member resignations in the FRRP sample average 1.5 in the defect year, compared with only a single board member in the control sample. In other words, 19% of the average eight-man board in the FRRP sample either resigned or retired in the defect year, compared with 12% in the control sample. These differences are not significant at conventional levels. Similarly, mean and median resignation frequencies are also statistically indistinguishable for the two samples in year -1. Finally, the rate of new board appointments in the FRRP sample is not significantly different from that in the control sample in either years 0 or -1.

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[31] We also estimated separate logistic models for each of the two defect sub-samples with similar null results. In addition, we estimated a series of nested logistic models in an effort to identify any systematic differences between the material and immaterial defect firms, conditional on censure by the FRRP. No systematic differences could be identified.

[32] In addition, all analyses of resignations were repeated using non-routine changes only. Non-routine changes are defined as all resignations not classified as routine, where routine changes are those where the board member (a) is 63 or older, (b) died or resigned on health grounds, or (c) is explicitly thanked in the Chairman's Statement for his/her contribution to the firm. Results based on non-routine changes do not differ materially from those based on the aggregate resignation measure.

For example, the average number of new board appointments in the FRRP sample is 0.9, compared with 1.1 in the control sample (p = 0.54). Thus, FRRP firms do not appear to be associated with greater board turnover up to and including the year in which the defective financial statements were issued.

Turning now to the post-defect period (years +1 and +2), results provide no support for the hypothesis that FRRP firms impose significant costs on incumbent board members in the form of higher dismissal probabilities. For example, the mean resignation rate among FRRP firms in year +1 (+2) is 0.7 (1.0) board members, compared with 0.9 (1.0) board members among firms in the control sample (differences not significant at conventional levels). These results are consistent with Agrawal et al. (1999) and Beneish (1999) who find no evidence that serious violations of US GAAP are associated with in an increased rate of director turnover in the post-violation period. Finally, additional tests indicate that the rate of new board appointments in the FRRP sample is similar to that in the control sample in the post-defect period. In particular, we find no evidence that FRRP firms seek to strengthen their boards through the appointment of additional outside board members following public censure for defective financial reporting. In summary, these findings suggest that defective financial reporting is neither a result of, nor a catalyst for, changes in firms' board composition.

7. Summary and conclusions

The objective of this study is to examine the characteristics of firms judged by the Financial Reporting Review Panel to have issued defective financial reports. We report two main findings. First, FRRP firms are characterised by weak earnings performance in the defect year. As further evidence of the performance difficulties facing censured firms, additional tests reveal that FRRP firms are more highly geared, less likely to sanction dividend increases, less likely to provide optimistic forecasts for the year ahead, and more likely to be involved in large-scale restructuring activities. Both Beneish (1999) and Dechow et al. (1996) find that firms subject to SEC Enforcement Actions for violating US GAAP are characterised by poor performance in the violation year relative to a size-, industry-, and time-matched control sample. However, while the performance of the FRRP sample is weak in the defect year, they do not appear to be perennial underachievers. One interpretation of our results is that short-term performance problems are an important cause of low accounting quality to the extent that they create strong incentives for managers to engage in creative accounting. This is consistent with the work of Degeorge et al. (1999) and Burgstahler and

Dichev (1997) who provide evidence of earnings management to avoid losses and earnings declines amongst firms in general.

Our second primary result relates to the impact of internal control mechanisms on the likelihood that a firm is censured by the FRRP. Consistent with prior work examining US firms charged with serious GAAP violations, we find that FRRP firms are characterised by weaker internal financial reporting controls. In particular, while univariate tests indicate no difference in the use of outside directors and audit committees between FRRP and control firms, multivariate tests reveal that the FRRP sample is associated with a lower proportion of outside directors and a lower frequency of audit committees. To the extent that cases identified by the FRRP represent examples of low accounting quality, these results support claims that effectively structured internal control mechanisms can help to improve the quality of published accounting data.

It is important to note, however, that on several other measures of board quality (e.g., the proportion of outsiders on the audit committee and the absence of a combined Chairman and CEO), FRRP firms appear to have better internal governance structures than the control firms. Tests reveal that FRRP firms are less likely to have a Big Five auditor. This is consistent with other research that has uncovered a positive association between auditor size and audit quality. However, additional evidence on the level of audit fees and the incidence of audit qualifications does not support the audit quality hypothesis. Overall, the relationship between the likelihood of FRRP censure and the quality of a firm's governance mechanisms must be deemed to be complex.

An inherent limitation of this study is the lack of information concerning the identities of firms referred to the FRRP but not subsequently subjected to censure. This makes it difficult to rule out the possibility that the observed relationship between poor performance and censure is simply due to defective financial reporting being more likely to be discovered during periods of weak financial performance as shareholders and other stakeholders engage in additional monitoring activity. Likewise, we cannot rule out the possibility that the lower incidence of Big Five auditors in the FRRP sample may reflect aspects of the censure process. For example, it may be capturing the FRRP's preference for avoiding confrontation with the large audit firms because of a higher perceived risk that the case will be challenged (and even lost). Alternatively, it may reflect the Big Five firms' superiority at managing the investigation process and negotiating a resolution that does not result in public censure. Similar problems arise in interpreting the results of US studies that have

examined the enforcement actions of the Securities and Exchange Commission (SEC) (e.g., Beneish, 1999; Dechow et al., 1996). In short, the question of whether the FRRP is an effective policeman of financial reporting remains an open issue.

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Book review

Reporting on solvency and cash condition. *J. A. Loftus and M. C. Miller.* Australian Accounting Research Foundation (Victoria), 2000. 327pp. ISBN 0-909-744-947.

This monograph, produced for the Australian Accounting Research Foundation, provides a comprehensive review of the information required to enable financial statement users evaluate company solvency and cash condition. It takes as its starting point the challenge of critics who claim, for example, that 'the accounting profession collaborates (with technically insolvent companies) by agreeing to paint false pictures of health in the balance sheets' (Sykes, 1996).

The authors meet this challenge by proposing a four-pronged model for the improved reporting of solvency and cash condition. Two elements of this model – reporting the cash effects of activities and reporting financial position – involve improvements to currently widely accepted financial statements. The other two components, however – the reporting of financial flexibility and vulnerability and reports to enable users evaluate the early stages of financial distress – entail greater use of narrative reporting than we are used to at present.

The central chapters of the book discuss each of these information categories in detail, drawing on empirical research, theory, conceptual frameworks and a range of international regulatory requirements. While the focus of the regulatory analysis understandably draws on the Australian experience, international, UK, Canadian and US standards are by no means neglected. The review of research in the field is a particularly strong feature of the monograph, with a 75-page Appendix containing brief summaries of 120 relevant research studies published up until 1998.

In the chapter on reporting cash flows, the authors come down strongly in favour of the less commonly found (in the UK at any rate) direct method for stating operating cash flows, citing intuition and a limited amount of empirical research in support of their position. They quite rightly focus also on the need to report recurring cash flows separately from those that are one-off or highly discretionary, but are forced to acknowledge that water-tight classification rules for achieving this can be elusive.

The shortcomings of the current/non-current classification are discussed at length in the chapter on reporting financial position. The authors point to the absence of international harmonisation in this area, and also refer to the fall from grace of the

current ratio as perhaps signifying a need for a new approach. They conclude, however, that none of the alternative classification bases (such as exchangeability, security or source) is without fault. In this, as in the previous chapter, the authors recommend that expanded management narratives can substitute where succinct financial statement numbers fall short.

The potential role of narratives really comes into its own in subsequent chapters, however. The authors remind us that risk reporting is still in its infancy and has failed to keep pace with changes in the environment. They provide a wide-ranging perspective on the direction risk reporting should be taking including, for example, information on the risks associated with excessive concentrations (of customers, of geographical markets, of sources of finance, etc.) and the provision of details on how estimates have been made.

While risk cannot be entirely eliminated, it can be mitigated by financial flexibility. In their discussion of the reporting of financial flexibility the authors recommend additional disclosures on matters such as fixed/variable cost structures and maintenance versus expansionary expenditures. Arguably, however, not enough is said about the associated reporting problems. What is the cost/benefit ratio of such disclosures? Can they be sufficiently reliable and comparable? What distortions is management likely to introduce, and can these be audited?

The final chapter is a plea for the reporting of more timely financial distress signals. What, however, should trigger the need for such disclosures? The authors' review of this issue includes their own investigation of a failed AICPA proposal in the US that would have required appropriate management disclosures whenever moderate cash flow problems were encountered. They conclude by favouring a conceptual rather than a detailed prescriptive approach to this issue.

When covering such a broad canvas some topics are bound to be neglected. The discussion of cash flow versus accrual accounting is very brief and, although recent work in this area is summarised in the Appendix, some of the rich findings of researchers such as Dechow (1994) could have usefully informed the authors' recommendations. An index longer than the five pages provided would also have been useful.

Overall, this monograph is to be highly recommended as containing a wealth of information on cash flow and solvency reporting, all couched within a plausible and workable conceptual framework. While this book will no doubt be of use to academics and also to auditors wishing to understand more about these issues, it is especially hoped that regulators will take up many of the recommendations contained in its pages.

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Sykes T. (1996). The Bold Riders: Behind Australia's Corporate Collapses. 2nd ed., Sydney, NSW: Allen & Unwin.

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